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SUPPLEMENTARY ANALYSIS OF THE PROPOSED AMENDMENT 18 INSHORE/OFFSHORE ALLOCATION OF POLLOCK IN THE BERING SEA/ALEUTIAN ISLANDS

Prepared by
the Staffs of the North Pacific Fishery Management Council
and the National Marine Fisheries Service

Anchorage, Alaska, Seattle, Washington,
LaJolla, California, and Silver Spring, Maryland

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1.0 INTRODUCTION

The North Pacific Fishery Management Council took final action on the Bering Sea/Aleutian Islands inshore/offshore pollock allocation during a meeting held August 3-5, 1992, in Juneau, Alaska. The preferred alternative was developed based on lengthy discussion of this supplementary analysis, extensive public testimony, as well as recommendations made by the Council's industry advisory panel and scientific committee. The preferred alternative adopted by the Council incorporates a percentage share allocation of the BSAI pollock total allowable catch between the inshore and offshore components, along with the designation of a Catcher Vessel Operational Area (CVOA) effective during the pollock "B" season.

The Council decision constitutes a resubmission and revision of original amendment 18 to the BSAI groundfish plan that was partially disapproved by the Secretary of Commerce on March 4, 1992. A parallel Amendment 23 to the Gulf of Alaska groundfish plan was approved on that date for 1992 through 1995. The supplementary analysis below examines the impacts of maintaining the status quo or choosing to allocate pollock between the inshore and offshore sectors. The draft analysis was made available for public review on July 9, 1992.

In August, the Council developed its preferred alternative which is described fully in Chapter 8. The preferred alternative was adopted by a Council vote of 10-1. This majority of Council members, broadly representing all components of the fishing industries of Washington, Oregon, and Alaska, concurred in the Council selection of the preferred allocation scheme as a suitable compromise between taking no action to resolve the preemption problem, and choosing a higher inshore allocation and imposing greater restrictions on the use of the Catcher Vessel Operational Area. The rationale for choosing the preferred alternative is described in Chapter 8.

1.1 Review of Past Action

Both the inshore and offshore sectors of the Alaska groundfish industry have experienced rapid growth in the last few years; estimates of processing capacity indicate that this industry may be capable of utilizing more than twice the current pollock and Pacific cod quota. This overcapitalization is increasing the competitive pressures on industry participants to obtain the volume of fish necessary to supply their processing capacity. In Amendment 18/23, the Council has defined the underlying problem to be one of resource allocation, where one industry sector faces preemption by another. With advice from industry, the Council developed several alternatives to address the preemption problem. Ultimately, eight management alternatives were considered in the analysis of the proposed amendment.

Alternative 1, the status quo alternative, evaluates potential impacts on inshore and offshore sectors if no action is taken to resolve the preemption problem. This alternative also provides a "baseline" for comparisons with the other alternatives. Alternative 2 examined the use of traditional management measures, like trip limits or exclusive registration areas, as a solution to the preemption problem. Alternative 3 proposed the establishment of percentage allocations of pollock and Pacific cod stocks to defined inshore and offshore processing sectors. Alternative 4 evaluates the allocation of these resources in set percentages to fishing vessels, based on vessel length. Alternative 5 proposed a series of pollock management measures such as a prohibition on roe-stripping, seasonal allocations, and establishment of smaller management areas, many of which have already been implemented. Alternative 6 suggested allocating TAC to fishing vessels based on those that catch and process and those that only catch fish and deliver to at-sea processors or shore plants. Alternative 7 expanded on an option raised in Alternative 3 where, following a decision to allocate pollock TAC to the inshore sector, a percentage of that allocation is reserved for processing by shore-based plants located in Western Alaska communities along portions of the Bering Sea.

The preferred alternative (Alternative 8) was adopted by the Council during their June 1991 meeting. This action prescribes a direct allocation of BSAI pollock, and GOA pollock and Pacific cod TACs, to the respective inshore and offshore components of the industry specific to each of the fishery management areas involved. The percentage shares apportioned to each component incorporate the Council's consideration of historical and anticipated resource utilization patterns, community, industry, and national economic stability, as well as conscientious management of the fishery resources affected. For the BSAI the pollock TAC would be allocated in a phased sequence over the four year life of the amendment as follows: year 1, 35 percent inshore and 65 percent offshore (35/65); year two, 40/60; and years three and four, 45/55. Generally, the preferred alternative moderately increases the percentage share of the BSAI pollock TAC available to the inshore sector, relative to the 1989 baseline. Specific provisions were added to address local access by the inshore fleet to fishery stocks in the BSAI, through the creation of a catcher vessel operational area surrounding Dutch Harbor. Offshore processors were restricted in access to this zone. In addition, 7.5 percent of the overall BSAI pollock TAC was made available for purposes of community economic development to qualifying native communities along the Bering Sea.

The preferred alternative (Alternative 8) placed a finite expiration date (December 31, 1995) on the prescribed regulatory actions, initiated a research plan for additional long range analysis of problems in the fishery, and directed expedited action on a vessel moratorium. These latter three actions serve as a bridge linking timely action on the immediate preemption problem to a more comprehensive, long term management regime.

The Council concluded that allocating the TAC between inshore and offshore users will provide the inshore sector with some relief from the adverse consequences of preemption by the offshore sector. Benefits of a preferential allocation primarily accrue to the shore-based catchers and processors, along with the affected local port communities. The economic and social benefits to inshore operations arise from increased or stabilized incomes, employment, and related economic activity. Benefits may also derive simply from reductions in the uncertainty, or threat of preemption that accompanies a set allocation. Generally, the percentage allocations of the TACs to the inshore category will necessitate a lowering of the share of the TACs currently being utilized by the offshore fleet. The reduction in tonnage available to the offshore component will result in economic losses to these operations, their supporting service industries, and communities.

The analysis recognizes that the risk of one industry sector preempting another is a direct result of overcapitalization within these fisheries. The remedy established by the preferred alternative provides relief from preemption *between* the inshore and offshore sectors, but does not address adverse competitive consequences arising *within* these defined sectors. The overcapitalization problem is not resolved by any of the proposed alternatives. As a result, the preferred alternative does not necessarily assure the financial stability of the industry or the inshore component over the long term. The ever-changing operational and economic conditions that have characterized the Alaska groundfish industry during the past five years cloud the estimation of precise impacts under the management alternatives proposed. These conditions inject some variability into the analysis, and preclude highly definitive measurement of many key issues. Where feasible, sensitivity analyses, or qualitative assessments of impacts are included to provide insight into such matters.

1.2 Action on Amendment 18 by the Commerce Department

After considering the regulatory analysis of the Council's inshore/offshore amendment, along with extensive public comment on the proposed action, in March 1992 the Commerce Department accepted in its entirety the Gulf of Alaska (Amendment 23) inshore/offshore plan, and portions of the BSAI Amendment 18. Regarding Amendment 18, Commerce Undersecretary for Oceans and Atmosphere John Knauss approved the Western Alaska Community Development Quota program, as well as the first year

35/65 inshore allocation of pollock in the BSAI, including designation of the catcher vessel operational area. The Undersecretary disapproved and returned to the Council the allocations proposed by Amendment 18 for 1993, through 1995, however, citing concern over projected economic losses estimated in a National Marine Fishery Service (NMFS) cost-benefit analysis of the allocations [Knauss, NMFS Study Team].

As a part of this decision to partially disapprove Amendment 18, Undersecretary Knauss advised the Council that the allocations for the latter years of the proposal could be resubmitted with supplementary supporting analyses for a 60-day Secretarial review, in order to have a plan in place for implementation early in 1993. Undersecretary Knauss goes on to state that:

> ...it will be necessary to provide another supplement to the environmental impact statement that will evaluate the economic effects of each reasonable alternative for addressing the preemption problem in succeeding years.

The guidelines suggested by Undersecretary Knauss for a supplementary analysis are noted in the following paragraph, excerpted from his letter to the Council:

> The Council should examine and refine the assumptions and methodology of the NMFS economic review. The Council may wish to identify countervailing benefits, modify the allocation percentages to minimize economic loss, if necessary, and/or meld a subsequent allocation proposal with a moratorium on entry into the groundfish fisheries. ... Given the significant economic cost to the nation [as estimated in the NMFS cost-benefit analysis] of the second, third, and fourth years of Amendment 18, I recommend that the Council carefully consider whether losses of that magnitude can be offset by other benefits.

Undersecretary Knauss further urged the Council to pursue management programs that allocate the fishery resource by methods other than the olympic system or direct government intervention:

> Over the long term, a program that reduces the cutthroat competition of the olympic system and relies more on free market decision, instead of government intervention, would seem to be the most viable alternative.

1.3 Revised Alternatives Proposed in the Supplemental Analysis

During their April 1992 meeting, the Council considered the actions and recommendation made in the Commerce Department decision, and elected to resubmit a revised amendment and supplementary supporting analysis for Secretarial action[1]. The Council reviewed the concerns raised in the NMFS cost-benefit analysis of the original allocation proposals, and received testimony concerning the scope, accuracy, and implications of that analysis. Based on this information, the Council adopted a modified set alternatives to be considered under the supplemental analysis. These alternatives are as follows:

1.3.1 Alternative 1

This is the status quo, or "do nothing" option. Under this alternative, no inshore/offshore allocations would be made for 1993, 1994, or 1995. The allocations prescribed from 1992, as well as the designated

[1]Although separate from the alternatives examined in this supplementary analysis, the Council has also prepared a plan amendment that would place a moratorium on the entry of new vessels into all Council-managed fisheries off Alaska, beginning in 1993 [NPFMC, 1992b].

catcher vessel operational area would lapse at the end of the 1992 season, although the Western Alaska Community Development Quota program would remain in effect. No other explicit actions would be taken to address preemption of the inshore sector in the BSAI.

1.3.2 Alternative 2

Allocation of the BSAI pollock TAC between the inshore and offshore sectors, after deducting the apportionment made to the Western Alaska Community Quota Development Program (CDQ), as follows:

Year	Inshore	Offshore
1993	30%	70%
1994	30%	70%
1995	30%	70%

The fixed 30/70 allocation will be considered with and without the designation of a catcher vessel operational zone around Dutch Harbor, as discussed below. This allocation alternative is an approximation of actual inshore and offshore shares of the pollock TAC in the recent past[2]. Establishing this allocation at existing market shares is different, however, than an unregulated status quo. Under the status quo, the allocation split in future years would not be prescribed. Thus, Alternative 2 would fix the allocation of the TAC between the inshore and offshore sectors based on a continuance of the inshore/offshore shares that existed in 1991.

1.3.3 Alternative 3

Allocation of the BSAI pollock TAC between the inshore and offshore sectors, after deducting the apportionment made to the CDQ program, as follows:

Year	Inshore	Offshore
1993	35%	65%
1994	40%	60%
1995	45%	55%

This phased annual increasing allocation to the inshore sector also will be examined with and without the designation of a catcher vessel operational zone around Dutch Harbor. Alternative 3 is the same percentage share allocations prescribed in the preferred alternative developed in the SEIS, and subsequently disapproved by the Commerce Department. Alternative 3 is being resubmitted based on concerns that the cost-benefit analysis used to estimate net national impacts may have incorrectly specified certain variables, leading to overstated estimates of losses to the nation.

1.3.4 Catcher Vessel Operational Area

Even with the designated share allocations of the BSAI pollock TAC as noted above, there is the possibility that inshore operations may be preempted from harvesting their share of the TAC, if offshore vessels concentrate their harvest operations in the waters adjacent to Dutch Harbor and Akutan. A catcher

[2]According to the NMFS estimates for 1991, approximately 28 percent of the pollock TAC was accounted for by shorebased processors. Combining this percentage with the catch volume accounted for by other qualifying inshore processors, such as "inshore" motherships as defined in the Amendment, the resulting status quo split of the TAC is approximately 29.50 percent inshore and 70.5 percent offshore.

vessel operational area (CVOA), defined as those waters inside 168 through 163 W longitude, and 56 N latitude south to the Aleutian Islands, has been proposed as fishing grounds that either restrict or exclude access by offshore processors in order to insure that inshore vessels are able to harvest their share of the TAC. The CVOA is not intended as an alternative in itself; rather, as an option to be considered under Alternatives 2 and 3.

1.4 Scope of the Analysis

The purpose of this analysis is to provide supplementary information to the Amendment 18 SEIS that evaluates the economic and other related effects of the proposed alternatives. The problem statement and Council objectives have not been changed from that presented in the SEIS:

> The Council defines the problem as a resource allocation problem where one industry sector faces the risk of preemption by another. The analysis will evaluate each of the alternatives as to their ability to solve the problem within the context of harvesting/ processing capacity exceeding available resources.
>
> The Council will address these problems through the adoption of appropriate management measures to advance the conservation needs of the fishery resources in the North Pacific and to further the economic and social goals of the Act.

The supplemental analysis narrows and refines the range of alternatives to be considered, and focuses on the salient impacts resulting from these alternatives. These actions are intended to follow the guidelines offered by Undersecretary Knauss in his March 4, 1992 letter to the Council regarding Amendment 18. The original Amendment 18 SEIS was divided into major chapters covering the environmental, economic, and social impacts of the alternatives considered, including the status quo. Concerns raised by Undersecretary Knauss relate primarily to economic impacts, specifically the costs and benefits that accrue to the nation as a result of the preferred alternative.

Based on the revised alternatives from Section 1.3, and the concerns raised by the Commerce Department, the scope of the supplementary analysis will include:

1. a cost-benefit analysis of the revised alternatives;
2. an updated assessment of income and employment economic impacts, by location, arising from the revised alternatives;
3. an examination of the environmental, economic, and social affects of the CVOA; and
4. a summary of social considerations pertinent to the revised alternatives, updating as necessary the Social Impact Assessment contained in the SEIS.

Each of these components are addressed in separate sections of this report. Overall results are summarized in the final section, directed towards the effectiveness of the respective alternatives, and the specific issues raised by the Commerce Department. This supplementary analysis does not reexamine the underlying characteristics of the problem, the Council's objectives, or other management alternatives previously rejected by the Council. Much of the analytical and descriptive base comprising the SEIS remains intact, although the reference point for the revised economic analyses was updated from 1989 to 1991, as described below.

The supplemental analysis was conducted during May and early June 1992 by a twelve-person inshore/offshore analytical team consisting of Council and NMFS staff, and a contact consultant who developed the statistical data base for the CVOA analysis.

1.5 Revisions in the Data Base and Analytical Models

The original SEIS was based primarily on information gathered in 1990 covering biological, economic, and social conditions in 1989 and the first half of 1990.[3] The analysis was completed in April 1991, and final Council action was taken in June 1991. The proposed amendment was ultimately forwarded to the Commerce Department in November 1991. The cost-benefit analysis undertaken in early 1992 by NMFS was predicated on 1991 conditions, so the results are not necessarily comparable with economic results in the original SEIS. Furthermore, the updated cost, revenue, and operating characteristics of the NMFS cost-benefit analysis employed certain simplifying assumptions that have been contested by industry[4].

Recognizing that portions of the 1989/90 data base were becoming outdated by both market and industry structural changes, the analytical team revised key economic performance information to better reflect current conditions in the industry. Key data assumptions and values concerning costs, prices, catch, output, efficiency, and discards were revised or updated to 1991 conditions. In the absence of a formal industry survey, data were gathered from numerous primary and secondary sources. The analytical team relied upon existing NMFS data series where possible in order to insure a consistent, unbiased source of information. The analysis also incorporates the reported or suspected range of data values for important variables such as product prices and product recovery rates.

During the analysis, it became apparent that some data reported by NMFS were at odds with that supplied by industry. In some cases, information supplied by the industry was completely outside the range of values contained in NMFS reports. Recognizing that the values used in the analytical models are instrumental in assessing economic performance, the analytical team determined that two alternative data scenarios would be considered, one based on the NMFS reports (referred to as the NMFS Scenario), and the second substituting industry-supplied data (referred to as the Industry Scenario). The reference to a NMFS Scenario does not imply a National Marine Fishery Service endorsement of all information and values used in the analyses. In some cases, the reported NMFS data were modified for use by the analytical team.[5] The terminology used to distinguish between the two data series is for convenience rather than implication of official endorsement. A more exhaustive data gathering effort might produce a single data series, although significant variation would still be anticipated. The two data scenarios differ primarily with regard to product prices and product recovery rates (PRR). The NMFS data scenario is generally more comprehensive than that supplied by industry, and where industry data were not available, the NMFS scenario was applied.

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[3] A survey instrument was designed specifically by NMFS to provide economic information for the inshore/offshore analysis. This questionnaire (referred to as the OMB survey) was distributed in August 1990, and returns compiled by the end of the year. The information requested covered cost, revenue, and operational characteristics of catchers and processors for 1989 and the first six months of 1990.

[4] Following presentation of the NMFS cost-benefit analysis at the April 1992 Council meeting, specific comments concerning the model and findings were assembled by the inshore/offshore analytical team, and are available from the Council office in Anchorage.

[5] Product recovery rates used in the NMFS scenario were modifications of the actual values assigned by NMFS for management purposes. Moreover, the range of product recovery rates applied to the NMFS scenario was developed by the analytical team, rather than official NMFS reports.

1.5.1 Cost Data

The firm-specific cost information gathered for the SEIS comprises the most comprehensive data base available for the overall pollock catching and processing industry. 1990 cost data were also made available for portions of the offshore sector. In general, however, no new cost data were gathered for 1991 in the time available for the analysis. Cost estimates for 1991 were therefore updated from existing 1989 and 1990 data using the producer prices index (PPI). The PPI during this generally recessionary period in the U.S. economy increased relatively little--roughly four percent between 1989 and 1991--such that cost adjustments were relatively small. Per unit costs would also be affected by operational efficiency, but these changes are captured in revisions made to PRRs, explained below.

1.5.2 Price Data

The analysis uses two sets of prices. The first set of prices are NMFS estimates which are based on industry responses to the collaborative NMFS/State of Alaska Processed Product Survey. These data combine for Alaska groundfish: the Alaska Commercial Operators Annual Report; the NMFS Annual Processed Product Survey; and the Weekly Production Reports (summarized on a quarterly basis). The second set of prices are industry estimates based on submissions by the American Factory Trawler Association (AFTA) and by the Pacific Seafood Processors Association, as well as by personal communications by both groups.

In a May 15, 1992 letter written to NMFS (Dr. Mark Holliday-NMFS Statistics Program), AFTA outlines a series of discussion points concerning NMFS estimates, transfer prices, and base point of comparison between shoreside and at-sea companies. Based on a sample of companies, AFTA further argues that NMFS estimates may understate actual at-sea prices by as much as 20 percent.

NMFS estimates are based on first wholesale prices which are the estimates of the price of the product as it initially leaves the plant. Another term for this level of price is or "ex-plant" where the seller values the goods in terms of its value on the plant loading dock. These prices do not include the costs of transportation and loading of the product from the plant gate to its final destination. This is the second step in the value-added chain where the steps in the chain are:

Value Added Chain

1) Catching and Harvesting
2) Processing
3) Cold storage, Marketing, brokerage, transportation, overhead, and management value.
4) Shipping costs to FOB Dutch Harbor
5) Domestic or foreign wholesale markets.

AFTA argues that shoreside and at-sea companies are reporting to NMFS prices at different steps of the value-added chain because "at-sea" processors typically have different business entities responsible for: (1) catching and manufacturing the product; and (2) subsequently selling, marketing, and distributing the same product." Consequently, intrafirm or transfer prices take place between the catcher/processor or mothership and its parent company. AFTA argues that the NMFS estimates intercept the at-sea processors at stage 2 of the value chain, while NMFS estimates intercept shoreside companies at the step 3 of the chain. Since most of the shore based pollock plants are based in Dutch Harbor, their ex-plant prices are very close to being FOB (Free on Board) Dutch Harbor Price or step 4. (Free on Board is where the seller delivers goods to a maritime vessel of the buyer's choice and assumes the cost and risk of loading them on board; ownership passes to the buyer once the goods have been loaded and an onboard bill of lading issued; buyer assumes all costs and risks of ocean shipment.) Thus, arguing that not only are the

NMFS estimates too low for the at-sea processors, AFTA also argues by inference that the differences between shoreside and at-sea prices are not great enough.

It would appear that AFTA's arguments can be supported to the extent that:

1. individual at-sea companies do have different business entities for the catching and processing and "parent companies" that sell, market, and distribute the product. (There are several single-vessel at-sea companies.)
2. firms ship their product via Dutch Harbor and primarily for export. (In comparison to fillets, surimi, roe, and meal are products that tend to be exported.)
3. that firms are not domestically vertically integrated with respect to processed product stages. (Several at-sea and shorebased companies produce intermediary pollock products such as surimi and fillets that are shipped to Washington State plants for further processing into surimi-based products or into breaded fillet products. One at-sea company also owns transportation vessels).
4. companies reported "ex-plant" as opposed to "parent" company prices.

AFTA's comments also call into question a need for a common point of comparing prices between user groups but also to assure that estimates of the costs of production are at a comparable point in the value-added chain. AFTA suggests that prices collected should be at the FOB Dutch Harbor level. The NMFS Processed Product Survey is predicated on a common point of ex-plant. In general, most U.S. companies do not have the same organizational structure as the at-sea processors and may choose to let independent firms do the marketing and distribution of the product. The NMFS Processed Product Survey is primarily concerned with estimating the value with primary fishery processed production; not the value of brokerage and transportation as these costs are associated with allied industries; not necessarily the fishing industry. It is not clear if the cost estimates developed based on AFTA and PSPA submissions or by submissions of the industry through the Inshore-Offshore Survey (referred to as the OMB survey) included all the costs incurred in the value-added chain up to the FOB Dutch Harbor level. That is, if the offshore prices are increased to reflect a higher level on the value added chain, processing costs may need to be adjusted upwards, as well. In addition, with respect to labor costs, there is a need to verify what level of prices are used for crew shares.

In response to AFTA's comments and recommendations, NMFS is reviewing its data collections policy and procedures as well as verifying with field interviews of at-sea and shorebased plants AFTA's arguments. As the prices collected fulfill the needs of the NMFS National Processed Products Survey, the Alaska Commercial Operator's Report, and the fishery monitoring needs of the North Pacific Council any changes in these policy and procedures most be approved by various Alaska State Agencies involved as well as by the relevant Council and NMFS entities involved. Industry price estimates and cost data developed for this analysis will also be correspondingly verified. Any significant changes as well as relevant industry/public comments from the public hearings on these issues will also be incorporated.

Both domestic and world prices for certain pollock products increased significantly between 1989 and 1991; in extreme cases more than doubling. Since only small increases were assumed for product costs, the price increases would be expected to significantly increase net returns to operators and share-based labor. Information on product prices is not publicly reported in a consistent fashion, however, and industry quotes may represent different qualities, market levels and terms of sale. The NMFS scenario prices offer a comprehensive series of product prices and sales volume, and also provide information on annual price variability. In some cases, however, the price information supplied by the industry is significantly different from the NMFS reported prices, raising concerns over the best representative price. The two different product price scenarios used in the economic analyses are listed in Table 1.1.

Table 1.1 1991 Bering Sea and Aleutian Island Processed Pollock Price Estimates ($/lb)

Sector/Product	NMFS Scenario		Industry Scenario	
	average price	standard deviation[a]	average price	standard deviation[a]
Offshore				
Roe	$5.38	$2.40	$4.87	$2.46
Fillets s/b	$1.28	$0.24	$1.42	$0.24
Surimi	$1.50	$0.22	$1.57	$0.22
Mince	$0.71	$0.16	$0.87	$0.16
Meal	$0.24	$0.02	$0.28	$0.02
Inshore				
Roe	$3.79	$0.20	$3.79	$0.20
Fillets s/b	$1.49	$0.29	$1.49	$0.29
Surimi	$1.26	$0.29	$1.47	$0.29
Mince	$0.68	$0.18	$0.68	$0.18
Meal	$0.26	$0.02	$0.26	$0.02

[a]The standard deviation is a statistical measure of variability in values around the average. In a normal distribution, approximately two-thirds of the values fall within one standard deviation of the average. Thus, the average plus and minus the standard deviation accounts for about two-thirds of the expected price range.

Prices reported in Table 1.1 are based on 1991 NMFS Processed Product Data and industry communications. Companies report to NMFS quarterly or annual prices that correspond to quarterly production estimates. Quarterly production estimates are based on submitted weekly production reports. Using available quarterly and annual prices and quarterly production estimates; average annual prices for each firm that reported prices was developed. Using these annual production and price estimates annual sector wide average prices were calculated. The standard deviation of individual firms around their sector average was the calculated. These standard deviations were applied to both the NMFS calculated and industry supplied average annual prices. Data supplied by the industry for use in the industry scenario was not suitable in determining an industry scenario standard deviation.

The size of the standard deviations reflect differences in prices received by individual firms. Reasons for these differences, in addition to the arguments above, include the following: quality, production of different amounts of product at each level of quality, different production periods, different sales periods, sales to different destinations, sales through different distribution systems; level of vertical integration; sales philosophy (maximize profits vs. marked share), and sales arrangements (multi-year contracts vs. consignment).

Prices for raw product delivered to processors is an important determinant of catcher vessel revenues. Both PacFin and industry price reports indicate that the price increases for finished products in 1991 did not necessarily trickle down to raw product round weight prices until relatively late in the year. As a result, exvessel pollock prices increased only slightly in 1991 ($190/ton), compared to 1989 ($176/ton). Price reports for the 1992 pollock A season indicate that exvessel prices have since increased significantly ($275-$300/ton).

1.5.3 Catch and Product Data

The principle source of catch and product data are NMFS Weekly Processor Reports, augmented with NMFS Quarterly Processor reports. Weekly Processor Reports are supplied to NMFS by each processor at the end of each reporting week. The data are in the form of actual processed product. NMFS applies standard product recovery rates (PRR's) to the reported products and back calculates round weight removals. Quarterly reports are also submitted by the processors, which NMFS uses to correct errors, oversights, and other revisions. Because NMFS uses standard product recovery rates the calculations of total removals are very sensitive to changes in these rates. The first column of data in Table 1.2 shows the PRR's used by NMFS in 1991 to calculate round weight. Note that in 1991 NMFS did not assume any differences in PRR's between the inshore and offshore sectors.

1.5.3.1 Product Recovery Rates

Product recovery rates applied in 1991 may not accurately depict what could transpire in 1992 and on into the subsequent years of the inshore/offshore proposed allocation. In particular, the 1991 recovery rates for roe, fillets, and surimi were viewed by the analytical team as unrealistic, given the changes in the fishery since these PRRs were established in 1990. The analytical team identified two alternative sets of PRRs; the "NMFS Scenario," closely linked to NMFS and analytical team assessments, and the "Industry Scenario," based on industry submissions. These two scenarios, along with the 1991 NMFS baseline PRR's, are shown in Table 1.2. The mode represents the PRR most likely to occur, and the high and low represent reasonable ranges through which the PRR could conceivable vary. The rationale for adjustments made to the 1991 NMFS baseline PRR's is discussed below.

In 1991, the Bogoslof area (the area denoted as 518 in Figure 4.1 on page 4-2) was a principal harvest ground for both sectors during the Winter and Spring (The "A" season). The Bogoslof area hosts large concentrations of spawning pollock in the early part of the year and therefore roe bearing pollock was easily available. Roe recovery rates in the Bogoslof were presumed to be very high and therefore NMFS felt justified in using a standard of 14% PRR for the 1991 season. In late 1990 the Council passed Amendment 14 in the BSAI which prohibited "roe stripping." This amendment did not come into effect until March, and therefore in the first two months of 1991 some processing of roe as a primary product occurred. From that time forward all roe was to be processed as ancillary, i.e. in joint production with another primary product. In 1991 the Council passed Amendment 17, establishing the Bogoslof area as a separate management area, and in 1992 effectively closed all directed fishing in the area by setting a TAC of only 1,000 mt. In light of these changes, the analytical team felt that a considerably lower range for roe recovery would forecast future effort more reliably and chose the ranges shown in Table 1.2.

The 1991 NMFS PRR for fillets (25%) was also considered to be high, based on examination of empirical data. After discussions with personnel from both sectors of the industry, "reasonable" ranges of the low, high, and modal recovery rate for pollock fillets were assessed. A 22% recovery rate was reported to be the maximum attainable if all equipment were running perfectly, and all fish were of a uniform and optimal size. The low range was established noting that it is likely that a large percent of filleting will occur in the "A" season when roe bearing pollock will yield lower percentages

Table 1.2 Product Recovery Rate Assumptions by Scenario and Sector

Sector/ Product	NMFS	NMFS/Team Scenario				Industry Scenario			
	1991 a\	mode	low	high	expected	mode	low	high	expected
Offshore									
Roe	14.0%	5.0%	3.0%	7.0%	5.0%	10.0%	6.0%	14.0%	10.0%
Fillets	25.0%	17.0%	13.0%	22.0%	17.3%	23.5%	22.0%	25.0%	23.5%
Surimi	15.0%	18.0%	14.0%	21.0%	17.7%	17.5%	14.0%	21.0%	17.5%
Mince	34.0%	25.0%	20.0%	34.0%	26.3%	29.0%	22.0%	36.0%	29.0%
Meal	17.0	16.0%	14.0%	18.0%	16.0%	18.0%	17.0%	19.0%	18.0%
Inshore									
Roe	14.0%	3.0%	2.0%	6.0%	3.7%	5.3%	2.5%	8.0%	5.3%
Fillets	25.0%	18.0%	14.0%	22.0%	18.0%	24.5%	22.0%	27.0%	24.5%
Surimi	15.0%	19.0%	15.0%	21.0%	18.3%	20.0%	18.0%	22.0%	20.0%
Mince	34.0%	25.0%	20.0%	34.0%	26.3%	29.0%	22.0%	36.0%	29.0%
Meal	17.0%	17.0%	15.0%	19.0%	17.0%	13.8%	8.5%	19.0%	13.8%
Note: Expected values are calculated as the average of the low, high and mode values.									

[a]NMFS product recovery rates for pollock were revised in 1992 from these 1991 rates.

of flesh. The 1% differential between inshore and offshore processors was assumed to reflect the advantages afforded by additional processing space and platform stability for the inshore sector.

NMFS used a 15% PRR for surimi in 1991. Surimi recovery rates are very difficult to calculate and to standardize because surimi itself is produced in many grades and levels of quality. Grade and quality depend on many things, among them, the quality of the fish going into the process, the amount of water added, and the end use the product. The analytical team assessed the NMFS standard to represent the low end of the expected recovery rates, and adjusted the model value upwards, accordingly, based on empirical data and discussions with processors. Again, the analytical team felt that the recovery rate offshore would on average be lower than recovery rates inshore and chose a low and modal value one percentage point lower offshore than onshore.

1.5.3.2 Variation in Product Recovery Rates

Table 1.2 also shows the expected value which result from the assumption that the PRRs fall within the range shown. Because no information is available regarding the actual distribution within that range the analytical team chose to use a triangular distribution around the modal value with low and high values representing the minimum and maximum value of the PRR. The expected value of any triangular distribution is calculated as the average of the minimum, mode, and maximum values. If the assumed range was symmetrical around the mode then the expected value of such a distribution would equal the mode. That is, if the mode was the midpoint between the minimum and maximum values then the mode would equal the expected value. If however the mode is one side or the other of the midpoint of the range then the expected value will fall between the midpoint of the range and the modal value. All point estimates of round weight in the **NMFS Scenario** and the **Industry Scenario** that follow will use the expected values of the PRRs shown in Table 1.2.

1.5.3.3 Estimation of Round Weight Pollock Harvest Shares by Sector

Given that NMFS 1991 standard PRRs were judged unlikely to occur in the future, the analytical team felt that using the 1991 harvest records as a reference point from which to base changes in status quo would be misleading. Therefore, the reference cases were adjusted to reflect the changes made in product recovery rates. Table 1.3 compares the 1991 harvest and production estimates from NMFS, with the revised NMFS and Industry data scenarios. Table 1.3 consists of 6 sets of data, each set consisting of three columns (**Product** weight, **Round** weight, and product **Mix**). Product weights in Table 1.3 consist of all primary and ancillary products. Round weight is back calculated by multiply the expected values of the PRR by the amount product from primary production. Product mix percentages (with the exception of discards) are calculated as the ration of product round weight to sector round weight less discards.

Data set 1 in Table 1.3 shows the reported production and the resulting round weight using NMFS 1991 PRRs; this was the data used by NMFS to manage the fishery in 1991. The inshore and offshore harvest share was calculated using the definitions of inshore and offshore as specified in Amendment 18. Thus, all motherships operating exclusively in state waters, and all catcher processors under 125 feet length overall processing less than 18 mt (round weight) per day were counted as inshore operations. As shown in Table 1.3, this assignment results in a 29.5/70.5 split of harvested pollock inshore and offshore. This was the basis for Alternative 2, which would allocate 30% of the pollock harvest in the BSAI to inshore operators, and 70% of the harvest to offshore processors.

Concerns that the 1991 data did not accurately account for all discards and that roe was processed as a primary product at least part of the year led the analytical team to make certain changes regarding discards and roe. This second set of data ("discards, roe adjusted") also reflects changes in reported products found in quarterly reports. Observer discards data was used to supplement discards reported in the NMFS weekly processor reports. Discards were increased 6,381 mt inshore, and 15,842 mt offshore. Analysts with the NMFS observer program believe these numbers are more accurate than the reported data alone; however, they caution that all discards were not observed, particularly from the shoreside sector. [Berger, 1992]. Data set 2 also makes the assumption that no roe will be processed as primary product in 1992 and beyond. Therefore all roe reported as primary product was shifted to ancillary production and the round weight that was previously reported as roe was reassigned into the other primary products. Using these revisions, the round weight total increases 81,902 mt, apportioned 21,142 mt to inshore and 60,760 mt to offshore, resulting in an estimated inshore harvest of 29.3% of the total.

The third set of 3 columns, **NMFS/Team Estimated PRRs**, employs the expected values of the product recovery rates shown in Table 1.2, using the product totals as calculated in the **Discard, Roe Adjusted** set of data. The total estimated removals are 1,415,542 mt. The inshore removals decrease, and the estimated offshore removals increase, primarily due to the changes in PRR's. The net effect is to shift the estimated percentage of the harvest inshore to 26.9% and the offshore harvest to 73.1%. The opposing shifts in round weight produced by the change in assumed PRRs is due to the differential amount of fillets and surimi in the two sectors. The application of the NMFS/Team PRRs increases the round weight resulting from the production of fillets and decreases the round weight resulting from the production of surimi. A relatively higher PRR will result in proportionately less round weight, and a relatively lower PRR will result in a proportionately higher round weight. The offshore sector produced relatively more fillets than the inshore sector, and therefore the increase to the offshore due to the production of fillets

Table 1.3

Adjustments made to Actual 1991 NMFS Data For Reference Cases (NMFS/Team, Industry)

	Set 1			Set 2			Set 3			Set 4			Set 5			Set 6		
	NMFS Processor Reports			Discards, Roe Adjusted			NMFS/Team Estimated PRR's			Convert to Main Products			Industry Estimated PRR's			Convert to Main products		
Sector	Product	Round	Mix	Product	Round	Mix	Product	Round	Mix	Product	Round	Mix	Product	Round	Mix	Product	Round	Mix
Inshore	101,056	400,932	29.5%	111,148	422,074	29.3%	111,148	381,013	26.9%	111,148	381,397	26.6%	111,148	352,361	27.2%	111,148	352,698	26.9%
Offshore	280,931	958,041	70.5%	305,099	1,018,801	70.7%	305,099	1,034,529	73.1%	305,099	1,052,625	73.4%	305,099	945,068	72.8%	305,099	959,876	73.1%
Total	381,987	1,358,973	100%	416,246	1,440,875	100%	416,246	1,415,542	100%	416,246	1,434,022	100%	416,246	1,297,429	100%	416,246	1,312,573	100%
Inshore	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**
whole:bait	1	1	0.0%	1	1	0.0%	1	1	0.0%				1	1	0.0%			
H&G W.	31	48	0.0%	31	48	0.0%	31	49	0.0%				31	49	0.0%			
H&G E.	2	3	0.0%	2	3	0.0%	2	3	0.0%				2	3	0.0%			
Roe	2,815	5,114	1.3%	2,657	0	0.0%	2,657	0	0.0%	2,657	0	0.0%	2,657	0	0.0%	2,657	0	0.0%
Fillets w/S&R	5	14	0.0%	5	14	0.0%	5	18	0.0%				5	15	0.0%			
Fillets w/RxS	245	817	0.2%	245	817	0.2%	245	1,131	0.3%				245	860	0.3%			
Fillets wo/S&R	10,756	43,026	11.0%	10,787	43,150	10.6%	10,787	59,930	16.4%	11,037	61,318	16.8%	10,787	44,030	13.1%	11,037	45,050	13.4%
Surimi	45,171	301,141	77.1%	48,130	320,864	79.1%	48,130	262,525	72.0%	48,130	262,525	71.9%	48,130	240,648	71.6%	48,130	240,648	71.6%
Minced	2,738	612	0.2%	2,738	612	0.2%	2,738	790	0.2%	2,738	790	0.2%	2,738	717	0.2%	2,738	717	0.2%
Fish Meal	22,594	40,046	10.2%	23,217	40,076	9.9%	23,217	40,076	11.0%	23,250	40,273	11.0%	23,217	49,548	14.8%	23,250	49,792	14.8%
Fish Oil	4,230	0	0.0%	4,322	0	0.0%	4,322	0	0.0%	4,322	0	0.0%	4,322	0	0.0%	4,322	0	0.0%
Bones	2,358	0	0.0%	2,523	0	0.0%	2,523	0	0.0%	2,523	0	0.0%	2,523	0	0.0%	2,523	0	0.0%
Discard	10,110	10,110	2.5%	16,491	16,491	3.9%	16,491	16,491	4.3%	16,491	16,491	4.3%	16,491	16,491	4.7%	16,491	16,491	4.7%
Offshore	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**	**Product**	**Round**	**Mix**
whole:food	466	466	0.1%	466	466	0.1%	466	466	0.0%				466	466	0.1%			
whole:bait	9	9	0.0%	9	9	0.0%	9	9	0.0%				9	9	0.0%			
H&G w/roe	23	33	0.0%	23	33	0.0%	23	34	0.0%				23	39	0.0%			
H&G W.	306	471	0.1%	306	471	0.1%	306	478	0.1%				306	523	0.1%			
H&G E.	2,281	4,073	0.5%	2,454	4,381	0.5%	2,454	4,461	0.5%				2,454	4,674	0.5%			
H&G xTail	1	3	0.0%	1	3	0.0%	1	3	0.0%				1	3	0.0%			
Steaks	62	617	0.1%	62	617	0.1%	62	617	0.1%				62	617	0.1%			
Roe	18,533	9,245	1.1%	18,072	0	0.0%	18,072	0	0.0%	18,072	0	0.0%	18,072	0	0.0%	18,072	0	0.0%
Fillets w/S&R	569	1,625	0.2%	619	1,768	0.2%	619	2,380	0.3%				619	1,793	0.2%			
Fillets w/SxR	780	2,600	0.3%	766	2,553	0.3%	766	3,535	0.4%				766	2,471	0.3%			
Fillets w/RxS	1,286	4,288	0.5%	1,285	4,282	0.5%	1,285	6,117	0.7%				1,285	4,430	0.5%			
Fillets wo/S&R	51,863	207,451	23.6%	53,585	214,339	23.2%	53,585	309,143	32.9%	56,272	324,649	33.9%	53,585	228,020	26.8%	56,272	239,457	27.7%
Surimi	86,736	575,654	65.5%	91,738	608,914	65.9%	91,738	517,002	55.0%	91,738	517,002	54.0%	91,738	521,926	61.4%	91,738	521,926	60.3%
Minced	6,372	13,984	1.6%	7,528	17,130	1.9%	7,528	22,117	2.4%	7,528	22,117	2.3%	7,528	20,083	2.4%	7,528	20,083	2.3%
Fish Meal	32,514	58,500	6.7%	33,215	68,972	7.5%	33,215	73,283	7.8%	36,536	94,036	9.8%	33,215	65,140	7.7%	36,536	83,588	9.7%
Fish Oil	132	0	0.0%	132	0	0.0%	132	0	0.0%	132	0	0.0%	132	0	0.0%	132	0	0.0%
Butterfly	19	43	0.0%	19	43	0.0%	19	65	0.0%				19	54	0.0%			
Discard	78,979	78,979	8.2%	94,821	94,821	9.3%	94,821	94,821	9.2%	94,821	94,821	9.0%	94,821	94,821	10.0%	94,821	94,821	9.9%

Notes: 1) "NMFS Processor Reports": Actual PRR's for 1991 and only reported discards. 2) "Discards, Roe Adjusted": Observer discards added as perscribed in the 1992 "best blend" treatment. All roe treated as ancillary product with projected round weight transferred to "most likely" substitute. 3) "NMFS/Team Estimated PRR's": PRR's adjusted to "reasonable ranges." 4) "Convert to Main Products": Minor products converted to"main products". 5) "Industry Estimated PRR's": Uses PRR's supplied by industry sources.

Product mix is calculated as the ratio of product round weight to sector round weight less discards. Discard% are calculated with respect to sector total round weight. Product round weights are calculated by multiplying primary product (total procduct less ancillary product) by PRR, thus there is no round weight resulting from procution of fish oil.

more than offsets the smaller round weight going into surimi as a result the higher surimi recovery rates. Fillets account for a lesser amount of the product mix inshore, and therefore the fillet PRR does not produce the same directional changes.

The fourth set of data condenses the range of product forms to include only major products. Production of whole, headed and gutted products, and steaks was shifted to meal production, and the production of fillets with skin, fillets with bones, and butterfly fillets was shifted to production of skinless/boneless fillets. These shifts resulted in increased overall round weight estimates, with relatively more going to the offshore sector. The numbers in this set apply to the **NMFS/Team Scenario.**

The fifth set of values in Table 1.3 reports the expected tonnage and product mix based on the **Industry Scenario** PRRs shown in Table 1.2. Total harvest is smaller using the Industry PRR's, relative to the NMFS/Team estimates, due to the higher PRRs for fillets, which significantly reduces the amount of round weight going into fillets. The sixth set of columns in Table 1.3 are the numbers used in the **Industry Scenarios** after assigning the minor products into the major product categories shown.

1.5.3.4 Uncertainty with Respect to Round Weight Removals

In the absence of comprehensive empirical data on direct harvest tonnages, estimates of removals used in this analysis require the back calculation of catch based on processed product reports, product recovery rates, and discards. The dependence upon often ambiguous PRR estimates undermines the precision with which operating efficiency, harvest shares, and total removals can be analyzed. As illustrated above, the NMFS 1991 baseline PRRs result in a harvest share of 29.5 % inshore and 70.5 % offshore, but adjustments deemed necessary in the underlying PRRs result in recalculated harvest shares closer to 27% inshore and 73% offshore. Similarly, the calculated total BSAI pollock removals vary from 1.43 to 1.31 million tons in response to changes in recovery rates represented in the NMFS and Industry data scenarios.

Table 1.4 illustrates the sensitivity of total removals, inshore/offshore harvest shares, and product mix based on the entire range of product recovery rates employed in the NMFS data scenario. The expected, minimum, and maximum values are derived from an assumed triangular distribution of PRR values as reported in table 1.2. The range and variability of these important parameters emphasize the degree of uncertainty that accompany the interpretation of single value point estimates developed in this analysis.

Table 1.4 Simulated Total BSAI Pollock Removals, Sector Share %, and Product Mix Using PRR's Based on NMFS/Team Data Scenarios

	Expected Value	Minimum Value	Maximum Value	Standard Deviation
Total (metric tons)	1,443,624	1,295,521	1,625,477	58,017
Inshore %	26.57%	22.34%	31.41%	1.42%
Offshore %	73.43%	68.59%	77.66%	1.42%
Inshore Shares (tons)	383,267	344,281	443,131	19,326
Surimi %	71.87%	66.05%	76.90%	1.85%
Fillets %	16.88%	13.16%	22.30%	1.57%
Meal %	11.03%	8.73%	13.07%	0.72%
Offshore Shares (tons)	1,060,357	925,761	1,234,985	55,186
Surimi %	53.89%	46.03%	62.85%	2.88%
Fillets %	33.99%	25.28%	42.47%	2.87%
Meal %	9.79%	8.07%	12.16%	0.72%

1.5.4 Discards

Pollock harvested but subsequently disposed of as unwanted product or waste is treated as a discard. Discards may range from small, unusable pollock caught incidentally in the target pollock fishery, to otherwise usable fish that are disposed of due to a lack of handling or processing capacity. Conventionally, discards are subtracted from catch tonnage prior to calculating product recovery rate, but discarded tonnage is included as a part of total harvest. The amount and rate of discard will affect the economic efficiency of individual operations, as well as the conservation achieved by the industry as a whole.

Table 1.5 reports the absolute and relative discard of pollock in the directed BSAI pollock fisheries by the respective inshore and offshore processing sectors in 1991. The reported discards are constant across both data scenarios, but the calculated total catch varies according to the data scenario, and this causes changes in the estimated discard rate. These estimates do not include the discard of other species harvested incidental to the pollock fishery, or pollock discarded incidental to another target fishery.

The estimated discard tonnage includes observed discards aboard inshore and offshore harvest vessels, as well as reported plant discards for shorebased and mothership processors. Vessel discard estimates are obtained from NMFS observer data. The coverage of inshore and at-sea pollock catcher vessels is incomplete, since vessels less than 125 feet receive only partial coverage by observers. By comparison, offshore catcher-processor coverage is virtually complete. The difference in coverage has raised concerns over the relative accuracy of the estimates for the two sectors, noting the possibility of higher-than-estimated discards by smaller catcher vessels when they are not carrying observers.

Table 1.5 Catch and Discards in the 1991 BSAI Pollock Fisheries, by Sector

Sector/Category	NMFS Scenario		Industry Scenario	
	1991 catch	% total	1991 catch	% total
Catcher-Processors				
pollock retained	828,192	90.5%	736,319	89.4%
pollock discarded	86,996	9.5%	86,996	10.6%
total pollock catch	915,188	100.0%	823,315	100.0%
Motherships (offshore)				
pollock retained	129,611	94.3%	128,735	94.3%
pollock discarded	7,826	5.7%	7,826	5.7%
total pollock catch	137,437	100.0%	136,561	100.0%
Inshore Processors				
pollock retained	364,906	95.7%	336,207	95.3%
pollock discarded	16,491	4.3%	16,491	4.7%
total pollock catch	381,397	100.0%	352,698	100.0%

1.5.5 Structure and Characteristics of the Industry

The dramatic growth in the domestic pollock fishery since the mid 1980s, as documented in the SEIS, had not completely abated by 1991. Despite ominous indications of overcapacity and financial stress, both the inshore and offshore sectors of the BSAI industry have added significant capacity since 1989. Inshore harvest and processing activity has increased from less than 20 percent of the pollock TAC in 1989 and 1990, to more than 28 percent in 1991, presumably as a result of the expansion in capacity undertaken by existing plants, and the addition of one new processor in Dutch Harbor. The offshore fleet also increased significantly between 1989 and 1991 with the net addition of approximately ten factory trawlers, the majority of which were pollock surimi and/or fillet vessels. To some degree, the further expansion of participants in the industry during the past two years has been facilitated by the increase in pollock product prices, which has allowed individual vessels or plants to increase total revenues, despite the availability of slightly smaller individual shares of the pollock resource.

Resource availability has also changed since 1989 due to the ban on roe stripping, division of the pollock quota into two distinct seasons, and the closure in 1992 of Area 518. The combined impacts of these changes has been to alter both temporal and geographic fishing patterns. The harvesting and processing activities relating to pollock roe, especially, have been changed significantly in many situations. As a result, the financial and operating assumptions used in this supplemental analysis have been adjusted to reflect expected yield and product mix in roe operations during the current 1992 year, as opposed to 1991.

The indicated changes in the number of participants and their performance is captured in the aggregated cost, price, recovery, and catch data as developed in Sections 1.5.1 through 1.5.4. From a definitional perspective, an additional change was made in the characterization of the inshore and offshore sectors as a result of the definitions put forth in Amendment 18. Specifically, floating pollock processors and motherships operating at fixed locations within the three mile zone would be considered as inshore processors under the definitions of the preferred alternative adopted by the Council in the SEIS. In addition, catcher-processor vessels less than 125 feet with less than 18 tons per day round weight processing volume would also be categorized as part of the inshore component. Based on 1991 processor reports and available information on operating characteristics, the respective inshore and offshore shares of the 1991 pollock TAC harvest were adjusted for the vessels falling within these redefined inshore categories. The aggregate impact of these reclassified inshore processors is small but significant; roughly 2 percent of the overall BSAI TAC is reclassified from offshore to inshore under these definitions.

1.5.6 Market Control and Foreign Ownership

In commenting on Amendments 18/23, two industry groups raised concerns about market control suggesting that shoreside preference gives inshore processors the ability to reduce market opportunities and prices received by independent catcher vessels and by at-sea processors of surimi. These comments, and the responses to the comments, are contained in the SEIS. While these concerns are important and may warrant further evaluation, the information and expertise are not sufficient to undertake such analyses here. Salient concerns, however, are noted below.

The American Independent Fishermen, a group of 24 trawlers, provided, in addition to others, the following comments to NMFS in their letter of January 31, 1992 :

"....The merits of the issue from the perspective of American Independent Fishermen are that Amendment 18/23:

1. Allocates Bering Sea/Aleutian Islands and Gulf of Alaska pollock and cod between at-sea and shoreside processors and dictates where catcher vessels will deliver their catches.

2. For the first time in American fisheries history eliminates the American fisherman's right to sell his catch to whomever he or she wants. In this instance, to sell cod or pollock to the best market available.

3. Promotes processor control, and largely foreign processor control, of the fishing industry and sets the stage for processors to become extensively vertically integrated -- at the expense of the independent fishermen.

4. Preempts independent catcher vessels with processor-owned catcher vessels and provides no recognition of our catch histories.

5. Provides windfall profits to processor-controlled catcher vessels which can be realized due to vertical integration at the vessel level, the local processor level, and in most cases at the parent company level in foreign countries.

6. Reduces the at-sea trawler fleets' historic rights to the pollock and cod fisheries by 65%-70%, thereby threatening the livelihoods of independent fishermen while providing windfall profits to processor-controlled catcher vessels."

The U.S. Surimi Commission (USSC), which is an export trading company organized under the Export Trading Company Act of 1982 is comprised of at-sea processors who collectively processed over 50 percent of the total 1991 U.S. surimi production. The USSC was formed because of "difficulties that independent (non-Japanese owned) U.S. companies were encountering in connection with their efforts to market at-sea surimi in Japan. The USSC estimates that Nippon Suisan and Taiyo controlled 80 percent of the Japanese surimi supply in 1987 and 45 percent in 1990. The USSC provided, in addition to others, the following comments in their January 31, 1992 letter to NMFS:

> "The Shoreside Preference Proposals Should be Rejected Because of the Anti-Competitive Effects They Would Have on the Ability of Independent Surimi Producers to Compete in World Markets."
>
> "Implementation of the Shoreside Preference Proposals Would Enable Nippon Suisan and Taiyo to Reassert their Control Over the North Pacific Pollock Resource and the Japanese Market."
>
> "Nippon Suisan and Taiyo would be given preferential access to 1 billion pounds and $448 million of the pollock resource." (Comparison of 1990 production shares to 55/45 split of BSAI pollock--Exhibit 6)
>
> "...We do not fault the investments that Nissui and Taiyo have made in our industry. What we are critical of is proposals that would afford Nissui and Taiyo investments preferred status or preferential allocations vis-a-vis the rest of the U.S. industry."

1.6 Organization of the Document

The following sections of this document present the results of the supplementary analyses. Section 2 is a comprehensive cost-benefit analysis, incorporating the revised alternatives and data adjustments described above, and including an examination of consumer benefits, foreign ownership, and market externalities absent in the original NMFS cost-benefit analysis.

The economic impact analysis is presented in Section 3. This examines the distribution of employment and income affects across the different communities and regions influenced by the BSAI pollock fishery. The baseline cost, revenue, income, and catch information in the economic impact model has be updated to match the same assumptions and values used in the cost-benefit analysis.

Section 4 examines the biological and economic impacts of the proposed catcher vessel operational area. The CVOA analysis examines the historical catch information reported inside and outside of this zone, and assesses likely differences in catches arising as a consequence of Alternatives 2 and 3. The results are not linked explicitly to either the cost-benefit or economic impact model, but the implications are directly applicable to the consideration of Alternatives 2 and 3.

Section 5 summarizes the social and socioeconomic consequences associated with the three alternatives. The conclusions are drawn largely from the social impact assessment (SIA) of affected communities presented in the SEIS, updated as a result of subsequent developments bearing on the revised alternatives.

The concluding Section 6 summarized the salient findings drawn from the respective analyses, and assesses the likely effectiveness of the proposed alternatives in resolving the inshore/offshore problem. Technical results and supporting documents are attached as appendices.

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2.0 COST-BENEFIT ANALYSIS OF ALTERNATIVE PROPOSED ALLOCATIONS

The objective of this analysis is to measure the net national economic benefits (or losses) that would result from the alternative proposed allocation schedules for BSAI pollock. Quantitative estimates of net benefits are developed through a standard cost-benefit (C-B) approach which uses the best available data and a level of sophistication appropriate to the quality of the data. Estimating procedures pattern the methodology used in a prior analysis of Alaska pollock and cod quota allocations, done by the National Marine Fisheries Service, with modifications to incorporate more current data and to clarify methodological issues that emerged from the earlier paper.[1]

2.1 Approach and Scope of the Analysis

Benefits are estimated for each year of the proposed three year allocation program, beginning in 1993 and extending through 1995. Projections are measured against the base year 1991 which is the most recent year in which no allocations were in effect. The base year (or status quo) is identified in the analysis as Alternative 1. A second alternative, labeled Alternative 2, proposes to allocate 30% of the adjusted total allowable catch (TAC) of pollock in the BSAI area to the inshore sector in each of the program years, and 70% percent to the offshore sector.[2] Under a third alternative, Alternative 3, the inshore sector would be granted a 35% share in 1993, and this would increase to 40% in 1994 and 45% in 1995. The corresponding shares for the offshore sectors would be 65%, 60% and 55%.

Benefits, for the purpose of this analysis, represent net gains in economic efficiency as measured by changes in producer surplus (or rent) in the inshore and offshore sectors. Producer surplus represents the change in producer revenue resulting from the allocations minus changes in operating costs and new economic investment. Operating and investment costs are social costs which represent foregone values that would accrue to society if the resources that go into producing pollock were used to produce other goods and services.[3]

In a C-B analysis, the calculation of net national benefits of a policy or action may also include changes in consumer surplus which is an approximation of the difference between what consumers are willing to pay for a product or service and what they actually pay as a result of the policy or action. As applied to an analysis of fishery management actions, the sum of changes in producer and consumer gains minus management and enforcement costs is considered the net benefit. In this analysis of the proposed allocations, the net benefit calculations include only producer surplus. Suitable data were not readily available to perform an analysis of consumer surplus, although a general discussion of how the proposed allocations may influence consumer surplus appears in another section of this report.

The approach used in this analysis to measure changes in producer surplus is the same for the inshore and offshore sectors. However, specific steps in the analysis are performed differently where comparable data were not available for both sectors.

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[1]National Marine Fisheries Service. 1992. "A Cost-Benefit Analysis of Pollock and Cod Quota Allocations in the Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish Fisheries." Final Report. The NMFS Economics Special Study Team. April 14, 1992. Washington, D.C.

[2]The published TAC is adjusted downward to allow for a 7.5% community development quota (CDQ) which will be in effect through the period analyzed.

[3]Benefits foregone by using a scarce resource for one purpose instead of for its next best alternative use are called opportunity costs.

The basic formula to compute changes in producer surplus (Δ PS) is:

$$\Delta PS = \sum_{i=1}^{n} (p_i \Delta q_i - c_i \Delta q_i)$$

where p_i is the price of processed product i, Δq_i is the change in production of processed product i, c_i is the average variable cost of production for processed product i, and n is the number of products considered. Note the simplifying assumptions that prices do not change as a result of the allocation, and that costs per unit of output do not change with the level of output. The change in producer surplus is calculated for both sectors and then summed to obtain the net benefit resulting from the allocation.

The analysis focuses on pollock production in the BSAI area only, and on principal product types, although it is recognized that the operating units, vessels and plants, produce a variety of species and product types. The processed products incorporated in the analysis include surimi, fillets, minced products, roe and meal.

The analysis also assumes that there will be no significant migration of vessels from the offshore to inshore operations while the allocation program is in effect during 1993-1995. The inshore and offshore sectors are treated as given, and the only thing that changes in this analysis as a result of the allocations are the harvests, and the quantities of processed product. The alternative 1 case (or status quo) is determined by conditions in 1991 which is the most recent full year in which no allocations were in effect. For each forecast year, a projection of producer surplus is made based on the proposed allocation and this is compared with the status quo of no allocation (per 1991). The only factor that changes in the forecast years is the distribution of the catch between the inshore and offshore sectors as prescribed by the proposed quota for each of the affected years. All other factors, e.g. prices, cost coefficients, etc. are held constant.

Within this general framework, the problem is to determine for each sector, the relative harvests of pollock, quantities of the various processed products, revenues received for those products, and the associated production costs. The procedure for these calculations is discussed below. Figure 2.1 traces the steps taken in the analysis to determine net benefits. The process differs slightly for each sector because a more extensive sample of detailed cost and earnings data was available for vessels in the offshore sector than for catcher vessels and plants in the inshore sector.

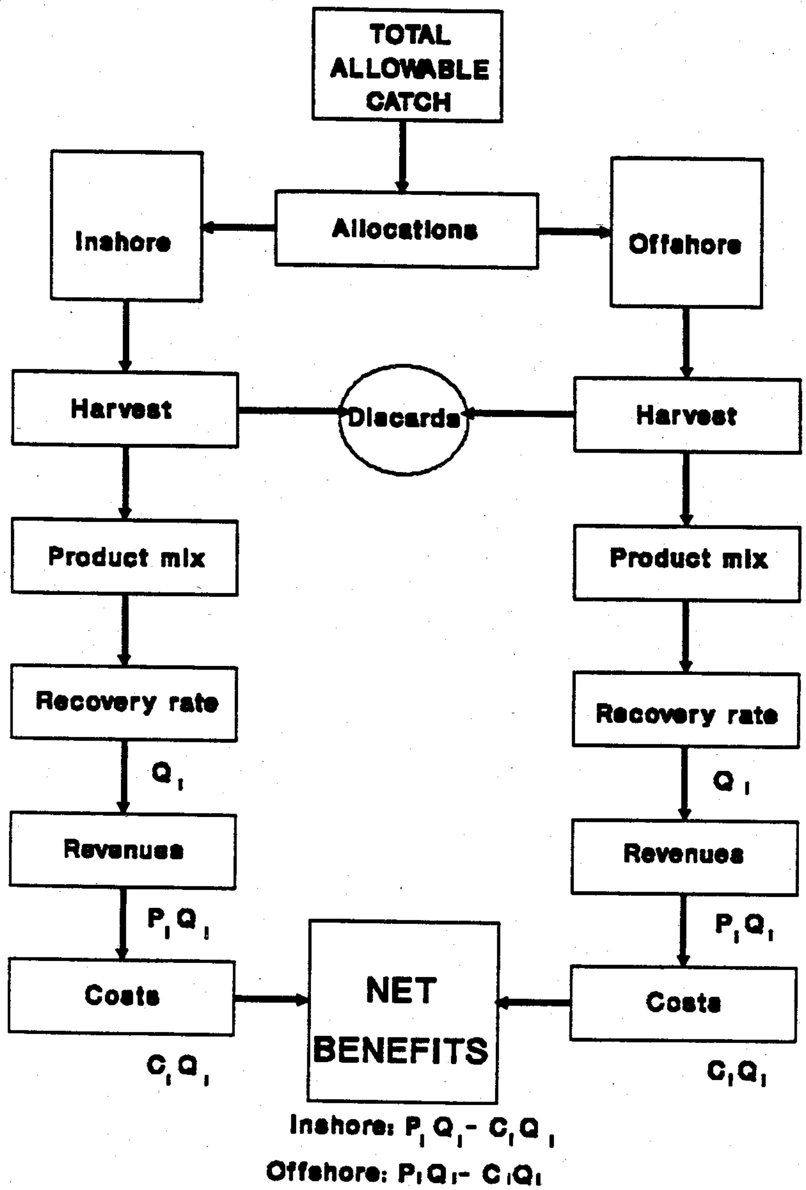

Figure 2.1 A schematic representation of the cost-benefit analysis used in the study

2.2 Risk Analysis

There is a degree of uncertainty about many of the variables essential to a cost-benefit analysis. This is particularly the case for parameters such as unit costs, product prices and product recovery rates. After an initial analysis in which the best point estimates of the factors are used, an assessment of the uncertainty surrounding critical assumptions is incorporated. To address the uncertainty, point estimates are replaced by a triangular (or other appropriate) probability density function centered around the original parameter estimate. The range of the distribution reflects the uncertainty about the true parameter value. A Latin Hypercube simulation technique (1,000 iterations) is then performed for the entire cost-benefit analysis. In each iteration a value is drawn randomly from the distribution for each item which is considered to vary. Net benefits are calculated for each iteration. Because the net benefit is now the sum of many random variables, it is also considered random with its own distribution. This yields an estimate of expected results, as well as information about the uncertainty surrounding those results.

2.3 Compensation to Labor

2.3.1 Nature and Calculation of Labor Costs

Payments to labor constitute a cost that is deducted along with other production costs in the calculation of producer surplus that accrue to a vessel or plant. Different modes of compensation among industry sectors require different procedures for estimating labor costs in the analysis. Vessel crews are paid through a percentage share system, which means that their compensation fluctuates with changes in vessel revenues which are a product of price and quantity.[4] This is true for all crewmen in the offshore fleet, including offshore processing line workers, and crewmen on inshore catcher vessels that serve the shoreside plants. Process workers in shoreside plants are paid on the basis of a wage rate, rather than on a share basis, and compensation will vary with hours worked or physical quantity of output. For the offshore sector, crew shares are based on the revenue from processed products and the change would be computed as:

$$\Delta CrComp_{offshore} = \alpha \sum_{i=1}^{n} (p_i \Delta q_i)$$

where ΔCrComp is the change in crew earnings, and α is CrShare, the percent of vessel revenue paid to the crew. For the inshore sector, only the catcher vessels use the share system, and the share is based on the revenues earned from raw fish sales to the processing plants, so the calculation of changes in crew compensation differs slightly:

$$\Delta CrComp_{inshore} = \alpha \sum_{i=1}^{n} (xvp_i \Delta h_i)$$

where xvp_i is the exvessel price and h_i is the amount of fish harvested.

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[4] Crewmen receive a stipulated share of a "pool" of revenues which represents gross revenues minus certain expenses. Within a given fleet there is not likely to be any significant differences in share arrangements among vessels.

2.3.2 Valuing Share-Compensated Labor

This analysis assumes that zero rent or surplus accrues to wage-based inshore processing labor. The share system of compensation for vessel crew raises questions about whether and/or to what degree, and under what conditions, can share-based crew payments be identified as a rent or surplus. Generally, the amount of compensation that exceeds (falls short of) crews' opportunity cost would qualify as a surplus (deficit), and hence would be included as a welfare gain (loss) in a cost-benefit analysis. The problem is to ascertain how much of the share-based payment to crew should be deducted from total revenues as a cost, and how much remains as a benefit. This is essentially an empirical issue, and beyond the scope of this investigation. However, for purposes of this analysis we can deal with this issue by posing two theoretical extremes between which reality is expected to lie.

At one extreme, crew labor is fixed. The entire change in the payment to crew when allocations are put in effect is considered an economic surplus (negative surplus) and would therefore be treated as a welfare gain (loss), instead of an economic cost, in the calculation of producer surplus. This is an economic benefit from society's standpoint since it is not forgoing any additional labor resources to obtain additional output. The empirical question is then the extent to which crews remain fixed.

At the other extreme, crew labor is completely variable and the share-based compensation to labor is valued in the same way as hourly wages. Hence, in the normal workings of the marketplace, both will tend to reflect the true, relevant opportunity cost of the labor in question. The entire change in the payment to share-based labor, following the allocations, is treated as an economic cost -- the crew payment equals its opportunity cost both before and after the allocations -- and there is no economic surplus, positive or negative, accruing to labor.

In the analysis we use these two extremes as endpoints of a uniform distribution to derive an expected value for the economic surplus payment accruing to crew. From the uniform distribution, the expected surplus accruing to crew is the mid point between the two extremes.

2.4 Key Variables in the Analysis

The following sub-sections enumerate the key variables in the calculation of revenues and costs used in the cost-benefit analysis. Data were obtained from NMFS sources and from industry sources. and the data from each are displayed in the statistical tables that accompany the text. Separate runs of the cost-benefit model were made to accommodate each source; i.e. one run uses all NMFS estimates of the key variables, and the other uses the data obtained directly from industry sources. (The results of each of the two runs are shown in a separate section of this analysis).

2.4.1 Total Allowable Catch (TAC)

The best available information on total allowable catches (TAC) for BSAI pollock is the published Federal Register notices for the 1992 TAC's.[5] It is assumed throughout the analysis that the 1992 TAC's will remain in effect through 1995. The TAC's are given in Table 2.1.

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[5]Bering Sea and Aleutian Islands, Federal Register Notice 57 FR 3952, February 3, 1992. Gulf of Alaska, Federal Register Notice 57 FR 2844, January 24, 1992.

Table 2.1 **BSAI pollock TAC, baseline catch shares and discard rates used in cost-benefit analysis**

TAC (1993/1994/1995):		1,352,600 mt	
		NMFS[6]	INDUSTRY[7]
CATCH SHARE:	INSHORE	26.6%	26.9%
	OFFSHORE	73.4%	73.1%
DISCARD RATE:	INSHORE	4.3%	4.7%
	OFFSHORE	9.0%	9.9%

2.4.2 Harvests

For this study, harvests are defined as catch prior to at-sea discards, whereas landings are defined as harvests minus at-sea discards. We calculated round weight harvests for each sector by deducting the Community Development Quota (CDQ) (7.5% of the TAC) from the TAC and then multiplying the CDQ adjusted TAC by the allocation percentages for each alternative. Landings are determined by multiplying harvests by one minus the appropriate discard rate. Allocation percentages and discard rates are shown in Table 2.1, landings are presented in Table 2.2.

[6]Based on statistics compiled by the National Marine Fisheries Service (NMFS), Seattle.

[7]Based on data provided by industry sources.

Table 2.2 **BSAI Pollock harvests and landings used in the cost-benefit analysis of inshore/offshore allocations (metric tons)**

Year	Landings Based on NMFS Estimates					
	Inshore			Offshore		
	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
1993	318430	359132	418987	835603	796898	739977
1994	318430	359132	478842	835603	796898	683056
1995	318430	359132	538697	835603	796898	626134
	Landings Based on Industry Estimates					
	Inshore			Offshore		
	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
1993	320810	357880	417410	824232	789279	732902
1994	320810	357880	477040	824232	789279	676525
1995	320810	357880	536670	824232	789279	620147

2.4.3 Product Mix

The term **product mix** in the analysis refers to the percentage of total landings **directly** processed into each of the various product types. **Ancillary** products are the by-products of primary production (e.g. meal). The amount of round weight allocated to each product was determined by multiplying the total landings by the product mix and ancillary product percentages shown in Table 2.3 for each sector.

Table 2.3 Product mix and ancillary product percentages used in the inshore/offshore allocation cost-benefit analysis

Product	Inshore		Offshore	
Primary:	**NMFS**	**Industry**	**NMFS**	**Industry**
Fillets	16.8%	13.4%	33.9%	27.7%
Surimi	71.9%	71.6%	54.0%	60.3%
Minced	0.2%	0.2%	2.3%	2.3%
Meal	11.0%	14.8%	9.8%	9.7%
Ancillary:				
Roe	0.7%	.75%	1.72%	1.88%
Surimi	0.0%	0.0%	0.04%	0.04%
Minced	0.7%	0.72%	0.16%	0.18%
Meal	4.3%	4.65%	2.04%	2.24%

2.4.4 Product Recovery Rates

Actual output levels for each primary product were determined by multiplying the amount of round weight allocated to each product by the respective product recovery rates. For the risk analysis, these rates were approximated by triangular probability density functions using the mode, minimum and maximum values shown in Table 2.4. The recovery rate for ancillary products is one (1).

Table 2.4 Primary product recovery rates, minimum/mode/maximum values, for the inshore and offshore sectors for the major products used throughout the analysis; expected values are given in parentheses

Prod.	Inshore		Offshore	
	NMFS	**Industry**	**NMFS**	**Industry**
Fillet	.14/.18/.22(.18)	.22/.245/.27 (.245)	.13/.17/.22 (.173)	.22/.235/.25 (.235)
Surimi	.15/.19/.21(.183)	.18/.20/.22 (.20)	.14/.18/.21 (.177)	.14/.175/.21 (.175)
Minced	.20/.25/.34(.263)	.22/.29/.36 (.29)	.20/.25/.34 (.263)	.22/.29/.36 (.29)
Meal	.15/.17/.19(.17)	.085/.138/.19 (.138)	.14/.16/.18 (.16)	.17/.18/.19 (.18)

2.4.5 Revenues

Revenues were derived by multiplying price times quantity produced.

2.4.5.1 Price

Processed product prices were held constant over the period of the analysis using the mean values for 1991 shown in Table 2.5. In the risk analysis prices were replaced by normal probability density functions incorporating the 1991 mean prices and their corresponding standard deviations. Where applicable (e.g for inshore catcher vessels), the exvessel BSAI price for pollock used in the analysis was $.09 per pound.

Table 2.5 1991 mean product prices (cents/lb), for the inshore and offshore sectors used throughout the analysis; standard deviations are given in parentheses

Product	Inshore		Offshore	
	NMFS	Industry	NMFS	Industry
Fillets	149 (29)	149 (29)	128 (24)	142 (24)
Surimi	126 (29)	147 (29)	150 (22)	157 (22)
Roe	379 (20)	379 (20)	538 (240)	487 (246)
Minced	68 (18)	68 (18)	71 (16)	87 (16)
Meal	26 (2)	26 (2)	24 (2)	28 (2)

2.4.5.2 Production

Using our procedure to allocate TAC and determine discards, landings, product mix and product recovery rates mix we were able to compute annual production levels by product for each sector under each alternative. Production by product for each sector for each alternative for the entire 1993-1995 period is shown in Tables 2.6 and 2.7.

Table 2.6 **Estimated production (kmt) under alternatives 1 - 3, by product and sector for the 1993-1995 period using NMFS parameter estimates**

Shore-based Product	Alt 1	Alt 2	Alt 3
Fillets	28.9	32.6	43.4
Surimi	125.9	142.0	189.4
Roe	7.0	7.9	10.5
Minced	7.1	8.0	10.7
Meal	60.8	68.6	91.4
At-sea Product	Alt 1	Alt 2	Alt 3
Fillets	147.3	140.5	120.4
Surimi	240.3	229.1	196.4
Roe	47.4	45.2	38.7
Minced	19.6	18.7	16.0
Meal	95.5	91.1	78.1

Table 2.7 **Estimated production (kmt) under alternatives 1 - 3, by product and sector for the 1993-1995 period using Industry parameter estimates**

Shore-based Product	Alt 1	Alt 2	Alt 3
Fillets	31.6	35.2	47.0
Surimi	137.8	153.7	204.9
Roe	7.6	8.4	11.3
Minced	7.8	8.7	11.6
Meal	66.6	74.2	99.0
At-sea Product	Alt 1	Alt 2	Alt 3
Fillets	161.0	154.1	132.1
Surimi	262.0	250.9	215.1
Roe	51.6	49.4	42.3
Minced	21.4	20.5	17.6
Meal	104.6	100.2	85.9

2.4.6 Offshore Costs

Detailed cost and return data for the offshore fleet (for 1990) were provided by the American Factory Trawlers Association (AFTA). The data were determined to be the best source of information on offshore costs made available in time to incorporate in this study. The information was collected from a sample of 64 offshore vessels and assumed to be representative of costs for the entire offshore fleet.

The cost estimates for the offshore vessels represent ex-plant production costs which correspond with the price data used in the analysis. (That is, transportation costs were subtracted from the total production costs). Because crew compensation was paid on a share basis, crew payments were calculated independently from the other production costs. Crew payments were then added to non-labor production costs and the sum deducted from total revenue to determine producer surplus. Labor costs per unit of processed product output were calculated by multiplying the ex-plant product price times the average crew share. The average crew share (23%) was calculated by dividing labor costs in the offshore processor vessel cost database by total revenue.

In order to allocate production costs other than labor to the various outputs, a linear regression was run of variable costs on the different quantities of the major products for each of the 64 catcher/processors in the data base. The major products were: Pacific cod fillets, headed and gutted pacific cod, other species headed and gutted, pollock fillets, minced pollock, surimi, pollock roe, and pollock meal. Production levels for these products were obtained from summaries of the NMFS weekly processed product reports which were determined to be the best source of information available on production of individual offshore vessels. The weekly processed product reports are compiled from observer data. Vessel identifiers in the observer data were matched with the vessels in the cost data base.

Regression results are presented in Table 2.8. The coefficients from the regression represent the estimated marginal and average costs for the various products[8]. The regression analysis performed reasonably well in explaining 57% of the variability in production costs and in having expected positive production costs for each of the major products of interest. The variability in these results was incorporated into the Monte Carlo risk analysis.

To calculate actual production costs, labor costs were added back to the coefficients from the regression as discussed above. This average variable production cost per unit of final product was then multiplied by the estimated total output of the final product under the various alternatives to determine the total production cost for the final product output. In the risk analysis, the fillet, surimi and roe coefficients were replaced by normal probability density functions with a means equal to the values of the regression coefficients and a standard errors as calculated from the regression analysis. The minced and meal coefficients were replaced by truncated normal probability density functions with minimum values of one cent per pound, have means equal to the values of the regression coefficients, standard errors as calculated from the regression analysis, and have maximum values equal to the means plus one standard error.

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[8]This cost function imposes constant returns to scale. It is not intended to be a substantively flexible functional form multi-product cost function that would allow estimates of scale economies and various production relationships among outputs. Data was insufficient to perform that flexible of an analysis.

Table 2.8 Results of regression analysis of variable costs minus labor costs on final product output for 64 offshore catcher/processors

Product	Coefficient	Standard Error	t-Statistic
Pacific Cod H&G	$0.02	0.26	0.06
Pacific Cod Fillet	$0.64	0.24	2.69
Pollock Fillet	$0.18	0.11	1.60
Pollock Surimi	$0.10	0.06	1.80
Pollock Roe	$1.06	0.62	1.71
Pollock Minced	$0.03	0.36	0.08
Pollock Meal	$0.06	0.11	0.51
Constant	1540	844	1.82
R^2	0.57		
N	64		

2.4.7 <u>Inshore Costs</u>

The relevant costs for estimating changes in producer surplus for the inshore sector are the costs incurred by catcher vessels in their fishing operations and by plants in their processing operations. We assumed catcher vessels and shore-based processing plants experience constant per unit operating costs. The per unit costs for each type of catcher vessel and shore-based processing plant were derived from their operational profiles. (These profiles are shown in the Appendix).

The average crew share for catcher vessels was calculated by dividing the reported crew cost by the total exvessel revenue presented in the catcher vessel operational profile. Non-crew variable cost was divided by total output to estimate average non-crew variable costs. The total harvesting cost for a given level of landings was then calculated by multiplying the non-crew average variable cost by total landings, multiplying exvessel revenue by crew share to get the crew payment, and then taking the sum of these two products.

We estimated the average variable production costs for shore-based processing plants by first separating raw product costs (landings times exvessel price) from total variable production costs reported in the shore-based plant operational profile. The remaining production costs were then divided by total output to estimate average non-raw product variable costs of production. Total production costs were then calculated by multiplying total output by the non-raw product average variable cost and adding this cost to the cost of raw product.

The approach used to calculate production costs for the inshore sector does not provide the information on uncertainty and variability of costs that the analysis of the offshore costs allows. At a minimum, the uncertainty surrounding production costs for inshore processors should equal the level of uncertainty we have regarding offshore processing costs. Therefore, we used information about the uncertainty of offshore processing costs as a guide to the level of inshore processing cost uncertainty. For the offshore processing sector we calculated the ratio of the standard error of the cost estimate to the mean. We then applied that ratio to determine the minimum and maximum values of the inshore processing cost in a triangular probability distribution. The minimum is the mean times one minus the ratio; the maximum is the mean times one plus the ratio. The minimum, mean and maximum values shown in Table 2.9 specify the triangular distribution for inshore costs, minus raw fish costs, used in the risk analysis. The minimum value of the triangular distribution is set to zero to correspond with the treatment of offshore costs where the normal probability distribution is truncated at zero. (See Table 2.9).

Table 2.9 Inshore processing costs per unit of output ($/lb.), Less raw fish costs

	Minimum	Mean	Maximum
Bering Sea Groundfish	.07	.30	.53

2.5 Results of Cost-Benefit Analysis

Using the techniques and data presented in the previous section, we calculated annual changes in net benefits, measured against Alternative 1 (status quo), as a result of implementing either Alternative 2 or Alternative 3. We then calculated the net present value (NPV) of the net benefits accrued over the life of the program (1993 through 1995), using a 5% real discount rate. Table 2.10 presents results based on the NMFS parameter and price estimates, and Table 2.11 displays results based on calculations that incorporate the industry parameter estimates.[1] The table distinguishes between surplus gains/losses accruing to vessels and the comparable gains/losses realized by vessel crews that are compensated on a share basis. The surplus (positive or negative) attributed to vessels and/or plants in all cases accounts for labor costs whether these represent shares or fixed wage payments. The surplus attributed to crew represents the expected "rent" earned or lost by share labor calculated from the uniform distribution described above. Although in the long run, producer rents in the open access pollock fishery may be expected to be dissipated, alternatives 2 and 3 are not a long-term allocation. The analysis of the allocation seeks to provide an assessment of what the changes in producer benefits would be over the next 3 years. It is certainly not inconsistent with the prospect of long-run dissipation of surplus, that one particular path towards that result may yield greater benefits.

The Alternative 2 program allocates 30% of the adjusted TAC to the inshore sector and 70% to the offshore sector through the three year life of the program. According to calculations based on the NMFS parameter estimates, Alternative 2 would result in a loss of $22 million to society over the effective period of the program. Of this total, $17.2 million represents a loss in producer surplus accruing to vessels/plants

[1]Tables 8 and 9 present results of implementing the alternatives selected for analysis by the Council. Tables C and D in the Appendix summarize the net benefits in a display that allows the calculation of net results for various other allocation combinations.

and a $4.9 million loss in crew rents (see Table 2.10). The loss in crew surplus is the mid point of the uniform distribution of crew surplus ranging from zero to the entire change in crew payments. If crew surplus is assumed to be zero the net benefit would only be the surplus accruing to vessels/plants, a negative $17.2 million in the above case. Alternatively, if the entire change in crew payment is considered a surplus the gains or losses in crew rents would be double the expected value shown in Table 2.10, i.e. $9.8 million ($4.9 million times 2), and the net benefit from the allocation would be this amount plus the surplus accruing to vessels/plants, a negative $27.0 million.

When the industry parameter estimates are used in the analysis (see Table 2.11), the expected net loss in benefits under Alternative 2 is $16.7 million, which includes $11.3 million in net producer losses to vessels\plants and a $5.4 million expected loss in crew rents, where crew rents range from -$10.8 million to zero.

Under Alternative 3, the inshore sector allocation in the first year of the program (1993) is 35% and then increases to 40% and 45% in the succeeding two years. The corresponding shares to the offshore sector are 65%, 60% and 55%. Based on NMFS parameter estimates (see Table 2.10), this alternative yields a cumulative loss of $85.8 million in net benefits, of which $66.8 million is the loss experienced by vessels/plants and $19.0 million is a loss in crew rents. The offshore sector under this alternative gives up $228.3 million in benefits (194 million without expected losses in crew rents), while the inshore sector gains $142.6 million or ($127.2 million without expected gains in crew rents). The calculation of changes using the industry parameter estimates (see Table 2.11) puts the net loss at $69.8 million ($47.2 million without crew rents), which represents $251.4 million in expected producer losses ($213.7 million without crew rents) for the offshore sector and $181.5 million ($166.5 million without expected crew rents) in expected gains for the inshore sector.

The risk analysis incorporates knowledge of the uncertainty of the many key variables necessary for the analysis and indicates that the probability of positive net benefits is 9.9% from Alternative 2 and 10.4% from Alternative 3, using calculations based on the NMFS data. Calculations based on the industry parameter estimates place the probabilities of positive benefits at 15.3% for both alternatives. These probability distributions are illustrated in Figures 2.2, 2.3, 2.4, and 2.5.

Based on the assumptions and data emloyed, the cost-benefit analysis indicates that given the present state of technology and market environment, the offshore sector is the more economically efficient in terms of utilization of the BSAI pollock stock. The net economic losses associated with diverting offshore pollock production to shore-based operators stem from the capability, at least now, of the offshore sector to convert the resource into a higher valued product at lower relative costs. This advantage in efficiency is adequate to more than compensate for the fact that offshore production has a somewhat lower resource utilization rate (i.e. higher discards and lower recovery rates) than production by inshore plants. In effect, the process of shifting offshore operations to shore-based plants undervalues the pollock stocks. Society loses a significant number of dollars that could otherwise be put to productive alternative uses.

Table 2.10 **Net benefits (losses) in millions of dollars to the inshore and offshore sectors resulting from proposed allocations, by year, using NMFS estimates, with Net Present Value for life of program**

		Year			
		1993	1994	1995	NPV (5% real rate)
Alternative 3 In/Off Allocation		35% / 65%	40% / 60%	45% / 55%	
Inshore	Vessel	$7.7	$12.3	$16.9	$33.0
	Plant	$21.9	$35.0	$48.0	$94.1
	Crew[1]	$3.6	$5.7	$7.9	$15.4
	Total	$33.2	$53.0	$72.8	$142.6
Offshore	Vessel	($45.2)	($72.1)	($99.0)	($194.0)
	Crew[1]	($8.0)	($12.8)	($17.5)	($34.4)
	Total	($53.2)	($84.9)	($116.6)	($228.3)
Net	Vsl/Plnt	($15.6)	($24.8)	($34.1)	($66.8)
	Crew[1]	($4.4)	($7.0)	($9.7)	($19.0)
	Total	($20.0)	($31.9)	($43.8)	($85.8)
Alternative 2 In/Off Allocation		30% / 70%	30% / 70%	30% / 70%	NPV
Inshore	Vessel	$3.1	$3.1	$3.1	$8.5
	Plant	$8.9	$8.9	$8.9	$24.2
	Crew[1]	$1.5	$1.5	$1.5	$4.0
	Total	$13.4	$13.4	$13.4	$36.6
Offshore	Vessel	($18.3)	($18.3)	($18.3)	($49.8)
	Crew[1]	($3.2)	($3.2)	($3.2)	($8.8)
	Total	($21.5)	($21.5)	($21.5)	($58.6)
Net	Vsl/Plnt	($6.3)	($6.3)	($6.3)	($17.2)
	Crew[1]	($1.8)	($1.8)	($1.8)	($4.9)
	Total	($8.1)	($8.1)	($8.1)	($22.0)

[1]Expected crew surplus (loss) given a uniform distribution of potential crew surplus from zero to the full change in crew share-based payments.

Table 2.11 **Net benefits (losses) in millions of dollars to the inshore and offshore sectors resulting from proposed allocations, by year, using Industry estimates, with Net Present Value for life of program**

		Year			
		1993	1994	1995	NPV (5%real rate)
Alternative 3 In/Off Allocation		35% / 65%	40% / 60%	45% / 55%	
Inshore	Vessel	$7.4	$12.0	$16.5	$32.2
	Plant	$30.9	$50.0	$69.0	$134.4
	Crew[1]	$3.5	$5.6	$7.7	$15.0
	Total	$41.7	$67.5	$93.3	$181.5
Offshore	Vessel	($49.1)	($79.5)	($109.8)	($213.7)
	Crew[1]	($8.7)	($14.0)	($19.4)	($37.7)
	Total	($57.8)	($93.5)	($129.1)	($251.4)
Net	Vsl/Plnt	($10.8)	($17.5)	($24.2)	($47.2)
	Crew[1]	($5.2)	($8.4)	($11.7)	($22.7)
	Total	($16.1)	($26.0)	($35.9)	($69.8)
Alternative 2 In/Off Allocation		30% / 70%	30% / 70%	30% / 70%	NPV
Inshore	Vessel	$2.8	$2.8	$2.8	$7.7
	Plant	$11.8	$11.8	$11.8	$32.2
	Crew[1]	$1.3	$1.3	$1.3	$3.6
	Total	$16.0	$16.0	$16.0	$43.5
Offshore	Vessel	($18.8)	($18.8)	($18.8)	($51.2)
	Crew[1]	($3.3)	($3.3)	($3.3)	($9.0)
	Total	($22.1)	($22.1)	($22.1)	($60.2)
Net	Vsl/Plnt	$(4.1)	($4.1)	($4.1)	($11.3)
	Crew[1]	($2.0)	($2.0)	($2.0)	($5.4)
	Total	($6.1)	($6.1)	($6.1)	($16.7)

[1]Expected crew surplus (loss) given a uniform distribution of potential crew surplus from zero to the full change in crew share-based payments.

Figure 2.2 **Results of risk analysis showing probability of different levels of net benefits for alternative 2, using NMFS parameter estimates**

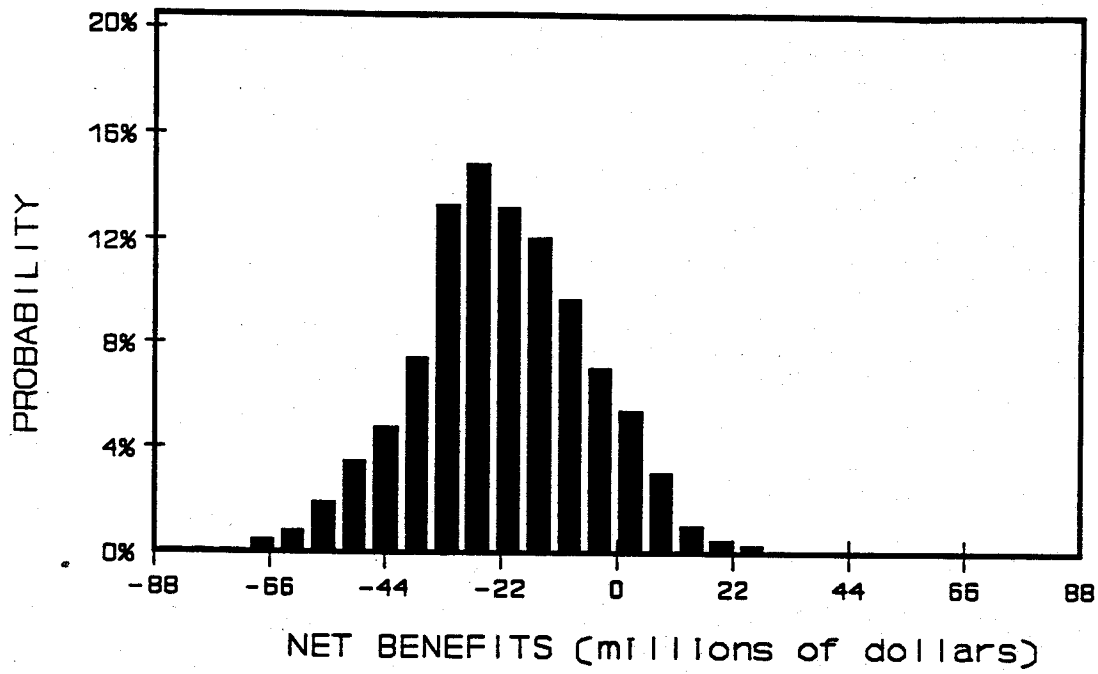


Figure 2.3 **Results of risk analysis showing probability of different levels of net benefits for alternative 3, using NMFS parameter estimates.**

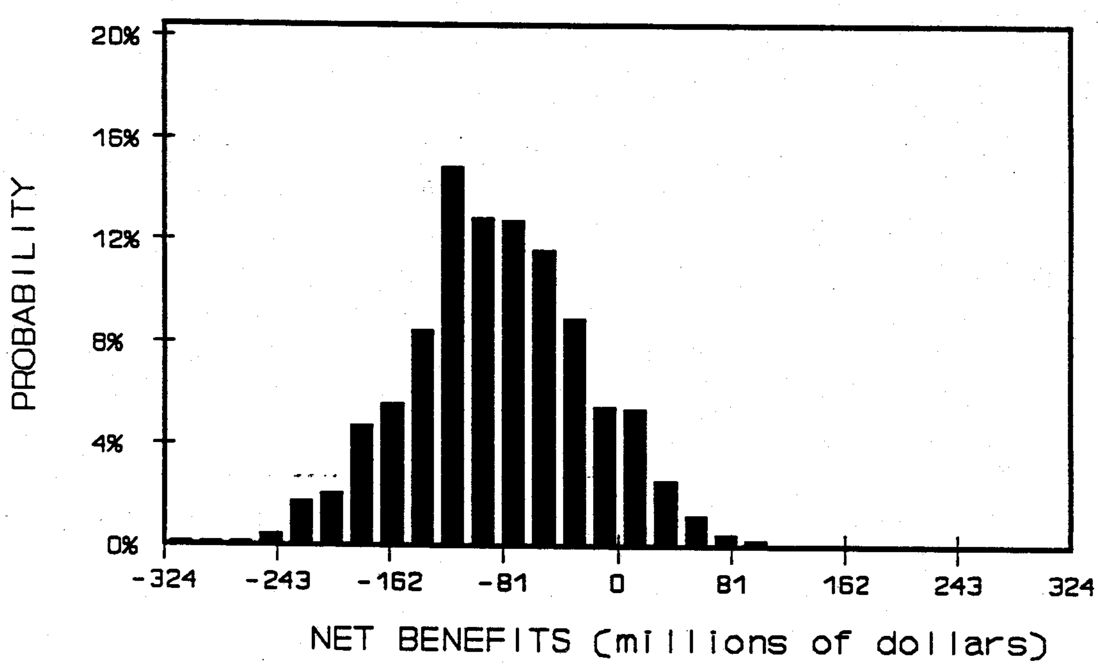


Figure 2.4 **Results of risk analysis showing probability of different levels of net benefits for alternative 2, using Industry parameter estimates**

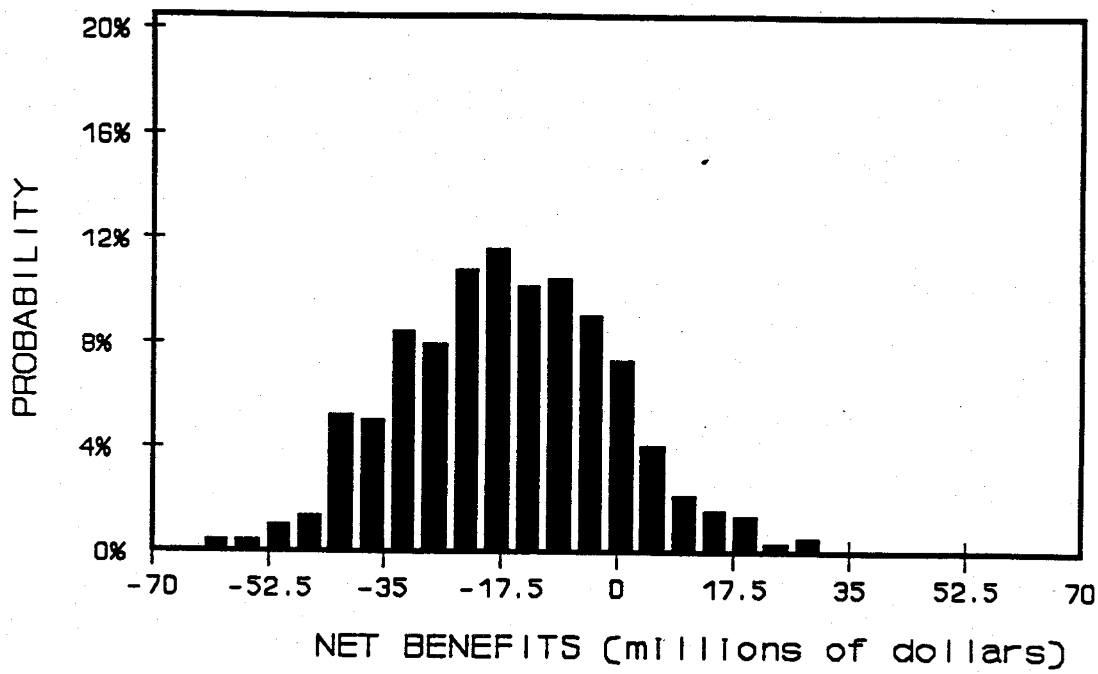
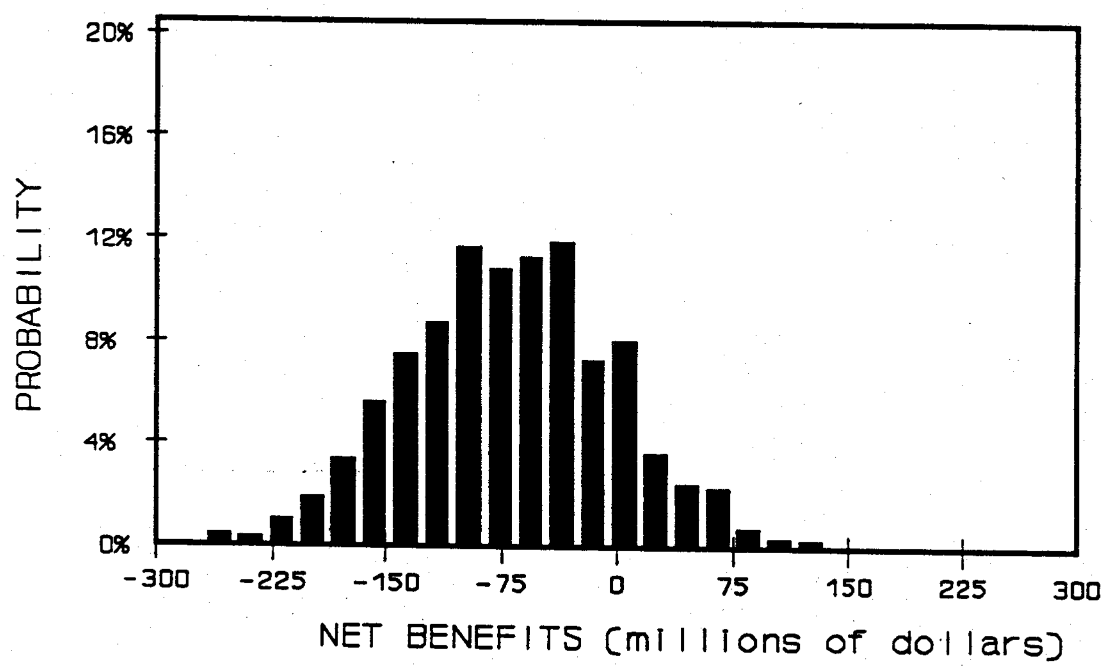


Figure 2.5 **Results of risk analysis showing probability of different levels of net benefits for alternative 3, using Industry parameter estimates**



2.6 Adjustments For Rents Accruing To Foreign Interests

The cost-benefit model results provide a measure of the total change in producer surplus among industry participants. These benefits accrue to foreign owners of catching and processing capacity, as well as to U.S. citizens/corporations. The Magnuson Act and other federal mandates specify that the Nation's fishery resources will be managed for the preferential benefit of U.S. citizens and corporations. Discussion of the extent to which fishery benefits are captured by foreign or domestic interests is important for two reasons. First, the fishery resource within the EEZ belongs to the people of the U.S. It is their responsibility to steward the resource, and their privilege to reap its benefits. Changes in policy which would increase producer or consumer benefits to foreign interests at the expense of U.S. interests would appear to run counter to the intention of existing national fishery management policy. Secondly, the inshore and offshore sectors of the processing industry are subject to differing rules regarding foreign ownership. For example, vessel documentation laws limit the amount of foreign ownership on processing vessels, while shorebased processing companies can have up to 100% foreign ownership. As a result, very different ownership profiles have emerged between the inshore and offshore processing operations. Consequently, examination of the implications of those differences is called for.

Because of these concerns, an effort was made to differentiate between the projected allocation benefits accruing to U.S. parties and those accruing to foreign interests. The SEIS provides a discussion of the degree of foreign ownership in the offshore and inshore sectors. The previous and current applications of the input-output model both utilized foreign ownership percentages of 75% inshore and 25% offshore, in accounting for leakages of expenditures out of the domestic economy. These estimates were based on information collected by NMFS and the Council. The percentage used for the inshore sector is a composite value that reflects differential rates of foreign ownership in processing and harvesting activities. This is likely a conservative measure of current foreign inshore ownership, as two new processing plants--which have opened since the original SEIS analysis--have a higher degree of foreign ownership than the previous sector average. Furthermore, the inshore estimates do not reflect recent acquisition of catcher vessels by inshore plants. The percentage of domestic ownership among offshore processors may also be conservative, in that recent rulings of the anti-reflagging act have realigned the ownership structures of several vessels more towards domestic ownership.

The percentage of foreign ownership in each sector is not a definitive measure of how net benefits are divided between U.S. and foreign interests, as discussed in Addendum I to the SEIS. Underlying patterns of ownership and dispersal of net returns may differ between companies. Other issues, such as how producer or consumer benefits accrued by foreign interests may be re-invested in the U.S. or contribute to an improved balance of trade, are beyond the scope and time available for this analysis. The analysis also does not address the issue of the transference of producer surplus between firms that are parts of larger vertically integrated corporations (domestic or foreign). Given the available time, the percentage of foreign ownership was selected as the proxy for the distribution of producer surplus between domestic and foreign parties. Minor adjustments to the ownership patterns of the two sectors, which would reflect the inclusion of at-sea processors who elect to process fish in an inshore mode, were not incorporated. This discussion of adjustments to the initial cost-benefit results is intended to categorize the first-round beneficiaries of the allocation, as a procedure for adjusting total benefits to account for payments to foreign interests.

Another issue that has been raised in public comment regarding the effect of foreign ownership on producer surplus is the matter of debt service which is paid to foreign financiers by American vessel owners. From the standpoint of who receives the producer surplus, as long as the foreign financier does not hold a stock/equity interest in the processing vessel, then the financier would not be expected to share in any of the profits which are earned in the fishery. Debt payments reflect the purchase of a loan, which in this context is little different than if some other input to the productive process, such as nets or electronics, had been purchased from a foreign supplier. In the input-output model, such payments are categorized as leakages, for the purpose of calculating the total effect of a company's expenditures. However, this portion of the analysis is not tracking expenditures, but the accrual of economic surplus, which should be generally unaffected by the parties to whom vessel owners happen to be in debt.

Table 2.12 reflects the results of the cost-benefit model using the NMFS parameter estimates. It provides a comparison of the predicted change in overall, non-labor producer surplus with that accruing only to U.S. owners of fishing/processing capacity. Under Alternative 2, the cost-benefit model predicts an overall loss of \$17.2 million in producer surplus, discounted at a 5% real discount rate, over the three years of the allocation. By applying the differential rates of foreign ownership to surplus changes in each sector, the loss in producer surplus accruing to U.S. owners is estimated to be \$25.9 million. The difference between these two figures--\$8.7 million--represents a transfer of surplus from domestic to foreign owners. Under Alternative 3, the 3-year loss in total producer surplus is estimated to be \$66.8 million. The estimated of loss to U.S. owners, however, is \$101 million, reflecting a transfer of \$33.2 million from domestic to foreign owners.

Table 2.13 presents the results of the cost-benefit model using the Industry data scenario. This set of parameters produces a moderate decrease in the predicted loss of overall producer surplus compared to the NMFS data scenario. Under Alternative 2, the amount of loss drops from \$17.2 million under the NMFS parameters, to \$11.3 million using the Industry numbers. Under Alternative 3, the overall loss is reduced from \$66.8 million to \$47.2 million. However, there is relatively little change in loss accruing to U.S. owners. With the Industry parameters, the loss of surplus to U.S. owners falls from \$25.9 million to \$24.4 million under Alternative 2. Under Alternative 3, the loss in U.S. producer surplus is virtually unchanged at \$101 million under the NMFS scenario, and \$102 million with Industry data.

These results indicate that the frame of reference for analyzing producer surplus is very important for this issue. The determination of whether this frame is total producer surplus, or only surplus which is likely to accrue to U.S. participants in the fishing industry, has a substantial effect on the magnitude of the net benefits and upon their sensitivity to the set of price and recovery rate parameters that are used in the analysis. Based on this procedure, and percentage foreign ownership assumptions, the loss of surplus to U.S. owners of catching and processing capacity, as a whole, is likely to be in the neighborhood of \$25 million in net present value over the 3 years modelled for Alternative 2, and a loss of \$100 million in producer surplus under Alternative 3.

Table 2.12 **Estimated net national non-labor producer surplus based on adjustments for foreign ownership; NMFS data scenario**

Alternative	Changes in producer surplus (P.S.) to all owners: non-discounted	Changes in producer surplus (P.S.) to all owners: discounted	Assumed P.S. to U.S. owners: discounted	Assumed % U.S. ownership
Alternative 2				
Offshore				
1993	(18,294,323)	(17,423,165)	(13,067,374)	75%
1994	(18,294,323)	(16,593,490)	(12,445,118)	75%
1995	(18,294,323)	(15,803,324)	(11,852,493)	75%
Cumulative		(49,819,979)	(37,364,984)	
Inshore				
1993	11,993,493	11,422,374	3,997,831	35%
1994	11,993,493	10,878,452	3,807,458	35%
1995	11,993,493	10,360,430	3,626,151	35%
Cumulative		32,661,256	11,431,440	
Net PS change		(17,158,723)	**(25,933,545)**	
Alternative 3				
Offshore				
1993	(45,197,740)	(43,045,467)	(32,284,100)	75%
1994	(72,101,157)	(65,397,875)	(49,048,406)	75%
1995	(99,004,574)	(85,523,873)	(64,142,905)	75%
Cumulative		(193,967,215)	(145,475,411)	
Inshore				
1993	29,630,984	28,219,985	9,876,995	35%
1994	47,268,474	42,873,899	15,005,865	35%
1995	64,905,964	56,068,212	19,623,874	35%
Cumulative		127,162,096	44,506,734	
Net PS change		(66,805,119)	**(100,968,678)**	

Table 2.13 Estimated net national non-labor producer surplus based on adjustments for foreign ownership; Industry data scenario

Alternative	Changes in producer surplus (P.S.) to all owners: non-discounted	Changes in producer surplus (P.S.) to all owners: discounted	Assumed P.S. to U.S. owners: discounted	Assumed % U.S. ownership
Alternative 2				
Offshore				
1993	(18,801,596)	(17,906,282)	(13,429,711)	75%
1994	(18,801,596)	(17,053,602)	(12,790,201)	75%
1995	(18,801,596)	(16,241,526)	(12,181,144)	75%
Cumulative		(51,201,409)	(38,401,057)	
Inshore				
1993	14,652,326	13,954,596	4,884,109	35%
1994	14,652,326	13,290,092	4,651,532	35%
1995	14,652,326	12,657,230	4,430,031	35%
Cumulative		39,901,918	13,965,671	
Net PS change		(11,299,491)	**(24,435,386)**	
Alternative 3				
Offshore				
1993	(49,126,750)	(46,787,381)	(35,090,536)	75%
1994	(79,451,904)	(72,065,219)	(54,048,914)	75%
1995	(109,777,058)	(94,829,550)	(71,122,163)	75%
Cumulative		(213,682,150)	(160,261,613)	
Inshore				
1993	38,285,109	36,462,009	12,761,703	35%
1994	61,917,893	56,161,354	19,656,474	35%
1995	85,550,677	73,901,891	25,865,662	35%
Cumulative		166,525,254	58,283,839	
Net PS change		(47,156,896)	**(101,977,774)**	

2.7 Consumer Impacts

Benefits accruing to consumers, in an economic sense, can be measured as the difference between what they would be willing to pay for pollock products, and the actual price they have to pay to in order to obtain the products in the market. The summation of these differences over the amount of product consumed provides a measure of consumer surplus.

A major element in determining the change in consumer surplus is the price elasticity of demand. Price elasticity is a measure of the proportional change in quantity that will be demanded by consumers relative to the proportional change in price. Because the demand curves for goods are normally downward sloping--i.e. consumers will buy more of the product is the price is lower--price elasticities are normally negative in value. If the elasticity value is greater in absolute value than 1, demand is said to be elastic. Accordingly, a 1% increase in price will elicit a greater than 1% decrease in the quantity demanded. If the elasticity value is smaller in absolute value than 1, demand is said to be inelastic. In such cases, a 1% increase in price will result in less than a 1% decrease in the quantity demanded. If demand is perfectly elastic--i.e. horizontal--a very small price increase can result in a complete loss of demand for the product. At the other extreme, with a perfectly inelastic--i.e. vertical--demand curve, an increase in price will have no effect on the quantity demanded.

2.7.1 Modelling The Fillet Market

Several studies in recent years have estimated domestic U.S. price elasticities of demand for various whitefish fillet products(Tsoa, Roy, and Shrank, 1991; Cheng and Capps, 1988; Tsoa, Shrank, and Roy, 1982). These studies have generally estimated price elasticities for cod, flatfish and haddock fillets at the wholesale level within the range of -0.4 to -0.7, meaning that demand is relatively inelastic. It is important to recognize, however, that these studies were based on data which predates a significant presence in the market of pollock fillet products. Assuming that pollock acts to some extent as a substitute for these other products, one would anticipate that with the current volume of pollock being consumed domestically, the demand for fillets of these other species, when viewed individually, would be somewhat more elastic. This would also be expected for pollock fillets, when viewed individually.

The issue of pollock's substitutability with other fish and food products is an important one, not only from the standpoint of adjusting previous estimates of price elasticity, but also in determining the appropriate scope of the present assessment of consumer surplus changes. It has been suggested by some representatives of the industry, that the relevant market for analysis should be viewed as a combined market for pollock and cod blocks/fillets, or even the entire whitefish market. In a 1982 study of cod, flatfish, and redfish fillets, Tsoa, Shrank, and Roy conclude that "Fillets of different species are not good substitutes for one another." While this conclusion does not address substitutability between cod and pollock, it does suggest that the appropriate scope for the analysis is something less than all whitefish fillets. In order to evaluate alternative specifications for the market analysis, an analysis of recent pollock and cod prices was undertaken. Two aspects of price behavior were focussed upon: correlation between pollock and cod prices, and the relative difference between prices.

Summaries of the analysis are presented in Tables 2.14 and 2.15. In each table, parallel sets of information are provided for monthly prices, deflated using the producer price index for fish, for two periods: 1987-91 and 1990-91. The latter subset of data was focussed on because it more closely corresponds to the base case timeframe of the analysis, and because it is more representative of a market

Table 2.14 **Comparison of monthly prices for pollock blocks and other pollock and cod products, including correlation coefficients and statistics indicating other product price as a percentage of pollock block price**

Product Type		1987-91 Price Per Lb.	1987-91 Correlation Coeff.	1987-91 Mean	1987-91 Stand. Dev.	1987-91 Range	1990-91 Price Per Lb.	1990-91 Correlation Coeff.	1990-91 Mean	1990-91 Stand. Dev.	1990-91 Range
pollock block	(S)	$0.754					$0.827				
Shatterpack pollock fillets	(S)	$0.913	0.879	121%	2%	96-156%	$1.038	0.842	126%	3%	107-156%
IFQ pollock fillets	(S)	$0.966	0.844	129%	2%	106-161%	$1.063	0.771	131%	3%	106-161%
Pacific cod blocks	(S)	----	---	---	---	---	$1.415	0.676	165%	6%	123-216%
Pacific cod fillets	(E)	$1.511	0.821	202%	2%	160-252%	$1.621	0.707	200%	6%	160-252%
cod blocks	(E)	$1.235	0.763	164%	3%	120-211%	$1.389	0.659	172%	5%	120-211%
Canadian cod fillets	(E)	$1.321	0.785	176%	3%	135-237%	$1.515	0.684	187%	6%	145-237%

Notes: (S) = F.O.B. Seattle; (E) = F.O.B. East Coast.
All correlation coefficients are significant at the 0.01 significance level.
All prices deflated using the producer price index for fish (1982=1.00).

Source: Economic Status of the Groundfish Fisheries off Alaska, NOAA Tech. Memo., NMFS F/NWC-215, April 1992.

Table 2.15 Comparison of monthly prices for pollock fillets and cod products, including correlation coefficients and statistics indicating other product price as a percentage of shatterpack pollock fillet price

Product Type		1987-91 Price Per Lb.	1987-91 Correlation Coeff.	1987-91 Mean	1987-91 Stand. Dev.	1987-91 Range	1990-91 Price Per Lb.	1990-91 Correlation Coeff.	1990-91 Mean	1990-91 Stand. Dev.	1990-91 Range
Shatterpack pollock fillets		$0.913					$1.038				
Pacific cod blocks	(S)				---	---	$1.415	0.756	128%	4%	113-171%
Pacific cod fillets	(S)	$1.511	0.934	167%	2%	137-194%	$1.621	0.947	159%	3%	137-183%
cod blocks	(E)	$1.235	0.808	137%	3%	105-182%	$1.389	0.892	137%	3%	109-167%
Canadian cod fillets	(E)	$1.321	0.898	146%	2%	115-185%	$1.515	0.924	149%	3%	125-178%

Notes: (S) = F.O.B. Seattle; (E) = F.O.B. East Coast.
All correlation coefficients are significant at the 0.01 significance level.
All prices deflated using the producer price index for fish (1982=1.00).

Source: Economic Status of the Groundfish Fisheries off Alaska, NOAA Tech. Memo., NMFS F/NWC-215, April 1992.

where substantial amounts of pollock fillets are being domestically consumed. Table 2.14 provides a comparison of prices for pollock fillet blocks with two other pollock fillet products and four cod products.

The price of pollock blocks is observed to be most highly correlated and closest in price to other pollock products. Correlation coefficients between the price of pollock blocks and each of the cod products were lower, between 0.66 and 0.71. While this level of correlation suggests a fair degree of substitutability between products, it is not overwhelming evidence. The summary statistics for the monthly price differentials are also informative. Price for the pollock fillet products averaged about 30% higher than block prices, with a range of from 6% higher up to 61% higher, over the 1990-91 period. Prices for Pacific cod and true cod blocks averaged about 70% higher than for pollock blocks, with a range of from 20 to 116% higher. Monthly prices for Pacific cod and Canadian cod fillets averaged roughly 90% above pollock blocks, ranging from 45 to 152% higher.

These values reveal a large amount of variability, over a 2-year period, in the relationship between pollock blocks and cod blocks; the nearest priced cod product. It is also useful to consider what sorts of consumer products are provided by fish blocks. A large amount of both pollock and cod blocks find their way into what may be referred to as "institutional" food service. These establishments typically operate on small margin of profit per unit of sales. Cod blocks may be a reasonable substitute for pollock when prices are within 20-30%. As the difference in price increases, however, those operations continuing to use cod will face relatively higher input costs and must rely upon differentiating their product as being--implicitly, higher quality--cod, in order to encourage consumers to pay a higher price. Considering all of these factors--correlation of price series, relative price level, and relative price variability--there would seem to be reasonable grounds for differentiating between these products in the analysis of consumer benefits. It should also be noted that the block form constitutes an estimated 70% of the domestic supply to the market and probably a higher percentage of imports, which account for 30-35% of domestic pollock consumption.

Table 2.14 illustrates the results of similar comparisons between prices for shatterpack pollock fillets, and the four cod products. The correlation coefficients between the cod products and pollock fillets are all much higher than is the case for pollock blocks. Both of the price series for cod fillets exhibit correlations of greater than 0.9 with pollock fillets, although monthly prices for cod averaged 50-60% higher than that of pollock. In both levels of correlation, relative magnitude and range, prices for cod blocks have a relationship to pollock fillets comparable to that between pollock fillets and blocks. These findings suggest a higher degree of substitutability between pollock fillets and cod products than was observed with pollock blocks.

The analysis of pollock and cod prices provides evidence that some pollock and cod products have a high degree of substitutability. The pollock products which are most closely tied to cod are the high-end shatterpack and IQF fillets. However, more than two-thirds of the pollock fillet market is comprised of blocks, which appear to have a greater degree of independence from cod prices. While an ideal treatment of these markets would attempt to capture all of the differences between product types, along with consumer substitution options, this analysis must be more general in nature. In simplifying the analysis, the question is one of where to draw the line: whether it is better to include cod products in the market analysis, or not. It is not clear how these results would differ from a joint analysis of a pollock-cod frozen fillet market. Although the proportional change in quantity would be much smaller in the combined market, the demand elasticity would be more inelastic, because more of the substitution options would have been incorporated in the market. additionally the price of this market's representative product would be higher than for pollock alone, and the quantity of product over which the price affect would be felt would be larger.

Another matter of importance in framing the analysis is whether to focus on changes in world markets, or only on those in the U.S. As discussed in the previous section, we are concerned primarily with fishery benefits, in this case consumer surplus, that accrue to U.S. persons. But the larger issue is one of how prices in U.S. markets are formed, and more specifically, through what process will they be affected by changes in the domestic production of particular types of product outputs. Theoretically, without barriers to trade, prices for fishery products in various markets around the world will differ only by the difference in transportation costs between the source of the fish and the markets. Quantities provided to each national market will be adjusted to the point where the market prices, net of transportation cost, are equal. Whether world markets for whitefish products actually operate in this manner is a matter which could be tested, given time and the necessary price data. Assuming that this is generally the case, the price change occurring in the U.S. markets for fillets and surimi should be driven by changes in the world price for these products that result from shifts in world supply. Using world production, as opposed to U.S. production implies that the percentage change in quantity available will not be as large. For this reason, it is also important that the price elasticity of demand also encompasses the world market. Unfortunately, studies which focus on estimating the parameters of world demand for these products could not be identified. Uncertainty concerning the appropriateness of using the identified national demand elasticities as a surrogate for those of the world market add to the caution associated with the quantitative results presented. The ranging exercise will make use of a range of demand elasticities based on U.S. studies, in order to estimate a change in the world price for pollock fillets/blocks, and also for a composite cod and pollock product, and then will estimate the change in consumer surplus based on the effects of the price change within the domestic market.

Assuming that demand for pollock fillets would be somewhat more elastic than the demand relationships estimated for related individual species prior to a large pollock presence in the market, the range of price elasticities used in the analysis will be from -0.5 to -1.0. Having determined an appropriate range of estimates for the change in equilibrium quantity in the domestic and world markets, the effect on price can be estimated using the inverse of the price elasticity, commonly referred to as price flexibility.[1] For the price elasticities being considered, the corresponding range of price flexibilities is from -2.0 to -1.0. The first value indicates that a 1% reduction in equilibrium demand will result in a 2% increase in market price. The initial price used in the model is $1.20/lb, which is a weighted average of the inshore and offshore fillet prices used in the cost-benefit model with the NMFS parameter set. Based on information provided by Garry Brown, the initial domestic consumption of fillets was assumed to be 100,000 mt. Initial world production, based upon current U.S. production and extrapolated FAO data from 1989, was assumed to be 220,000 mt.

In addition to the elasticity of demand for pollock fillets, another factor which will influence the magnitude of any change in consumer surplus is the elasticity of the supply curve for pollock products, as well as the degree to which the industry supply of alternative pollock products will shift, given changes in the relative prices of those products. If no additional pollock fillets could be brought into the U.S., or world, market from any source, the supply curve would be perfectly inelastic--or vertical--at its intersection with demand curve. Such a circumstance might occur if the existing product mix of the pollock processing industry were fixed. In this case, one would expect a very large percentage in the change in

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[1] This inverse relationship between price elasticity and price flexibility is noted here as the simple mathematical relationship, based on the ratio of percentage change in quantity to the percentage change in price. Independent estimation of price flexibility will often not result in obtaining such an inverse relationship, given the functional form of the estimation technique used.

domestic allocation to be transferred into a drop in consumption. However, this is not likely to be an accurate portrayal of the real industry response. Both domestic and foreign operations produce both fillets/blocks and surimi. Since large amounts of surimi are currently being produced, there is flexibility for more fillet production to occur. The decision of how much of each product to make is based on each company's cost structure, its expectations regarding future prices, as well as its operating objectives.

Several factors are important in evaluating how the supply of fillets from all sources will respond to an initial allocation away from the domestic sector which has a higher current rate of fillet production. In the short-term, one would expect to see a reduction in the quantity of fillets provided to the domestic (world) market, which will elevate price. But this price increase makes it marginally more profitable than it was previously to produce fillets. Therefore, some firms are apt to shift more of their raw pollock into fillet production and out of surimi. The question is, what will the magnitude of this new fillet production be, compared to the initial reduction in fillet production predicted solely on the basis of prior product mix ratios and sector allocations.

Clearly, this compensation in fillet production will not be 100%. A complete return to the original levels of total fillet production would imply that the equilibrium price for fillets after a reallocation does not change. Yet, in order to return to that level of fillet production, given the new allocation, companies that found it profitable to produce x% fillets before, would have to produce a higher percentage, without the product being more profitable. Because the existing rates of product mix differ so greatly between operations, it is obvious that all participants in this fishery will not respond in identical ways to marginal changes in relative prices.

Much of the difference in current product mix reflects decisions that were made in the past, regarding, for example, what type of filleting machinery to purchase. Toyo machines yield a higher recovery rate for making surimi, but do not produce fillets that are well-suited for the fillet/block market. Baader machines produce the best fillets for market, but reportedly yield a lower recovery rate than Toyo machines when fillets are subsequently processed into surimi. In the short term, operations having both machines will have the highest degree of flexibility is adjusting product mix, followed by those with Baader machines. Those with Toyo machines only, will be restricted to making surimi in the short-term. Even when operations have both kinds of machines, their flexibility to switch between products will depend on decisions in the more recent past regarding the amount of appropriate packaging and other production ingredients specific to each type of product which the company chooses to maintain at its production site.

In the longer-term, operations have opportunities to replace or add new equipment to take advantage of price changes for surimi and fillets. The cost of the new machinery can be relatively cheap, on a per-pound-of-product basis, if the period of amortization is long enough, for instance 10 years. As companies face uncertainty regarding the future movement of prices, they may expect to have to amortize the value of the machine over a much shorter period. The shorter this period is, the larger the change in prices will have to be in order to encourage someone to replace or add different machines. The decision will also be influenced by whether the operation has sufficient room to house both types of machines, concurrently, or whether existing machines must be removed from productive use. In the latter circumstance, the operation is not necessarily buying increased flexibility in production, it is trading the output capabilities of one technology for those of another. Clearly, when an initial reduction in fillet production raises price relative to that of surimi, those organizations that can switch to higher output of fillets at the least cost will do so first. In general, one would expect operations that have been producing surimi from Baader fillets to switch first, followed by plants with both machines, and then those that currently have only Toyo machines. Those having only Baaders will switch first because they achieve a lower surimi yield from their machines than a plant that has both, and hence will have a greater internal differential in the profitability of the two products. It should be noted also that, if the allocation creates a market situation that encourages plants to invest in new equipment that they would not otherwise have purchased, i.e. equipment which is not needed under the status quo, this represents an additional economic cost. So, while adjustment is possible, the fact that it is unnecessary under the current management regime means that new investment in fillet equipment that would reduce the impact on consumers carries with it a lessening of producer surplus.

In addition to previous investment decisions, other factors may also contribute to the observed differences in product mix. Plants with similar equipment may differ in the relative profitability with which they can produce surimi and fillets. Consider a case where, at an initial set of prices, production of surimi yields \$0.03/lb more profit (on a round weight basis) than fillets for Firm A, while the differential is \$0.10/lb in favor of surimi for Firm B. Assuming that costs remain unchanged, if the price of fillets rises by \$0.08/lb, relative to surimi, Firm A will see an advantage from switching to fillet production, while Firm B will not. Furthermore, even plants with the same underlying levels of product profitability may not have the same expectations regarding the magnitude and duration relative price changes over the next several years. Thus even though actual price differentials might suggest an advantage to switching production, it is the company's previous expectations of price that have led them to their particular choice for product mix during the current period. Another factor that may contribute to different product-mix responses to price changes is the possibility that all firms in the industry may not be seeking to achieve the same set of objectives. The normal economic paradigm for the firm is one of profit maximization. If companies have other competing objectives, or if the time-frame over which they evaluate profitability is sufficiently long, some production parameters, such as product mix, may not be particularly responsive to shorter-term fluctuations in relative product prices. For example, Japanese companies are commonly perceived as placing a high value on maintaining control over a given share of their product's market. If those shoreside plants which are controlled by Japanese interests are more concerned with maintaining market share in the surimi market, particularly in Japan, than on shorter-term profit maximization, one would expect to see less responsiveness in their product mix to changes in relative product prices. The question is, in response to an initial supply reduction and price increase for fillets, how much will firms that already produce fillets increase their production by, and at what point will operations that have not produced any fillets be induced to do so.

In an effort to better understand how changes in price might affect product mix decisions, and hence supply of product reaching the domestic market, we reviewed the quarterly output of processors over 1990 and 1991. This was done to see what percentage of operations had only produced one form of output, and also to evaluate the responsiveness of product mix to changes in price for those companies that produced both products. The 8 shoreside processors--including motherships acting in"shoreside" mode--that were active during these two years were rather evenly split between the three possible modes of operation: surimi-only, fillet-only, or production of both products. However, the surimi-only operations accounted for about two-thirds of the total shoreside production of these products. Of the 55 offshore processors during this period, 51% produced only fillets, 15% only surimi, and 35% produced both. In contrast, more than 50% of the combined production of surimi and fillets in the offshore sector came from vessels that made both products. About 28% was produced by surimi-only operations, with just under 20% coming from fillet-only vessels. Unfortunately, the time-series of information available is too short to attempt any sort of meaningful estimation of how product mix is effected by changes in relative prices. Additionally, very little can be said regarding the responsiveness of product mix in foreign fishing operations.

The responsiveness of supply in shifting product mix ratios is difficult to assess, then, for several reasons: there is a short time series of data with which to judge the behavior of domestic producers, there is very little readily available information with which to assess the response of foreign pollock operations, and there is a lack of understanding about how all of these firms, domestic and foreign, formulate expectations regarding the magnitude and duration of relative price changes between surimi and fillets. Furthermore, the response to an initial supply shock is a dynamic process, which is rather difficult to model in a highly simplified way. Lacking the time to develop a simultaneous equations model, a two stage adjustment approach is used. In the first stage, supply of fillets is treated as perfectly inelastic, i.e. no additional pollock is available for fillet production and no change in product mix occurs. Consequently, the quantity provided to the market falls by the entire amount predicted by the cost-benefit model.[2] In the second stage, a supply response--which is intended to capture any normal elasticity of the supply curve and any changes that occur in product mix--is incorporated, based on the magnitude of the price change observed in stage 1. While this is necessarily a crude approximation of the real process, it is an attempt to incorporate the greatest amount of realism possible within the time constraints of this analysis. Although it is assumed that the adjustment will not be complete, for reasons outlined above, there is little in the way of empirical support for predicting the magnitude of the supply response to a change in price. For this reason, two sets of partial supply responses are considered as alternatives to the no-response values. In both sets, it was assumed that a larger "initial" price increase would induce a larger shift back towards the initial market quantity. Predicted price changes in the analysis of Alternative 1, using the world market for pollock fillets only, ranged from 1.4% to 5.9%, depending on the demand elasticity and the amount of the predicted annual production. In the intermediate price response scenario, 20% of the initial drop in fillet production was assumed to be recovered with the low smallest price increase, ranging up to 40% for the highest. In the high supply response scenario, 50% of the initial drop in fillet production was assumed to be recovered with the low smallest price increase, ranging up to 70% for the highest. After adjusting the world supply by these amounts, a new "equilibrium" price for the revised market supply is assessed. This new price is then used to estimate the change in U.S. demand and consumer benefits.

It is important to emphasize that this assessment is not intended to reflect the long-run equilibrium effects of an allocation. The time horizon of these proposed changes is 3 years, and many long-run adjustments may not be achieved within this period. It may take some time for price expectations to be formed, and it may also be unclear to industry participants how long a price change is likely to persist. If plants must change equipment in order to respond to prices, further delays to the adjustment process may be expected. Thus, even if, in the longer term, the difference in fillet production is rather small, that adjustment may not be witnessed over the 3-year period of the proposed allocation.

In addition to change in consumer surplus this portion of the analysis addresses an aspect of producer surplus that was not addressed in the that section. When price rises in the domestic market, as a result of a supply shift, consumer surplus is reduced. As shown in Figure 2.6, the shifting of supply from S to S", causes the domestic price to rise from P to P'. Consumers lose surplus equal to the area A+B+C. At the same time, much of the surplus lost to consumers is transferred to producers. This area of transfer is represented by areas B+C. However, because 30-35% of the domestic pollock fillet market is supplied by imports, it is clear that a substantial portion of the gain to producers (areas B+C) will accrue to foreign producers at the expense of wholly domestic consumers. Because we are only concerned with benefits received by U.S. interests, the assessment of net impact is adjusted accordingly. It should also be noted that producers lose some of their initial surplus, represented by area D, as the supply curve shifts from S to S". This loss in producer surplus associated with the reduction in quantity is reflected in the results of the cost benefit analysis, although no change in product mix is assumed. The gain in producer surplus resulting from the increase in price, however, is not captured by the cost-benefit results, since prices are assumed to remain unchanged within that model.

Estimates of the net present value (using a 5% discount rate) of the change in surplus are characterized

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[2] In the case where only U.S. demand is assessed, the drop in the fillets provided to this market is not the entire change in production, since a portion of production is currently exported.

in two ways for each of the elasticities and supply response scenarios being considered. The first indicates the total change in benefits to consumers (areas A+B+C). The second reduces the total consumer surplus change--loss in the case of fillets--by the amount of the domestic producer surplus gain associated with the price increase ((areas A+B+C) - 0.65*(areas B+C)). These estimates are provided in Tables 2.16 and 2.17. Results based on the product output predicted using the NMFS parameter estimates for the cost-benefit model are presented along side those based on the industry-supplied parameters. Findings are discussed in the conclusion of this section, in conjunction with results of modelling the surimi market.

2.7.2 Modelling the surimi market

Surimi is the other major pollock product for which a domestic market exists. As with fillets, this domestic market is part of a larger world market, although the difference in size between the world market for surimi (at roughly 400,000 mt) and the domestic market (roughly 36,000 mt) is much greater than for pollock fillets. Although a majority of the world's surimi is produced from Alaskan pollock, escalating prices have led to the increased production from a variety of other species.

Estimates of changes in domestic consumer surplus changes in the market for surimi are marked by even more uncertainty than those developed for fillets. Because surimi has not been consumed in large quantities for very long in the U.S., studies estimating domestic demand characteristics are not available. Unlike the case of fillets, where some other products of similar form may be used as a guide to ranging demand elasticities, no products in the domestic market have such a similarity with surimi. Kim, Johnston, and Berglund have estimated price elasticities for Japanese consumption of various types of analog products. But two areas of uncertainty remain regarding the appropriateness of relying on these estimates. First is the matter of whether these elasticities for more highly processed analog products are good indicators of the elasticity for raw surimi. Second, even if they are, it not clear that they are reflective of world demand, or U.S. demand, in particular. Additionally, the level of domestic consumption of surimi is known in somewhat more general terms, due to ambiguities in import-export statistics.

Surimi is also characterized by different grades of product. Different grades vary according to such characteristics as gel strength, water holding capacity, color and flavor. The previous cost-benefit analysis provided information on price differentials by grade, throughout 1991 (Table 7). But at least two factors contribute to the inability to incorporate potential changes in quality into the current analysis. First, as noted by Sylvia, there is no standardization in evaluating product grades. And, even if there were, NMFS does not collect grade-specific information regarding amounts and prices of surimi produced. Various claims have been made by the inshore and offshore segments of the industry regarding the comparative production of top-grade surimi the two sectors. Although this analysis includes no assumption that product quality will change as a result of either of the alternative allocations, it is worthy of mention that such a possibility exists. Since it is usually necessary to blend top-grade surimi with lower grades in order to achieve the minimum desired characteristics in analog products, demand for high-grade surimi may be more inelastic than that for lower grades. If the overall increase in surimi production predicted for the allocation alternatives were to include a reduction in output of top-grade surimi, the resulting price increase in that segment of the market could largely offset the price reduction expected in the lower grades of product.

Analysis of consumer surplus changes in the domestic surimi market were conducted using the same approach as for fillets. The change in industry surimi production predicted with each alternative and set of parameters was added to world production (400,000 mt), and changes in world price were calculated using a range of possible demand elasticities. Based on the elasticities identified for Japanese analog

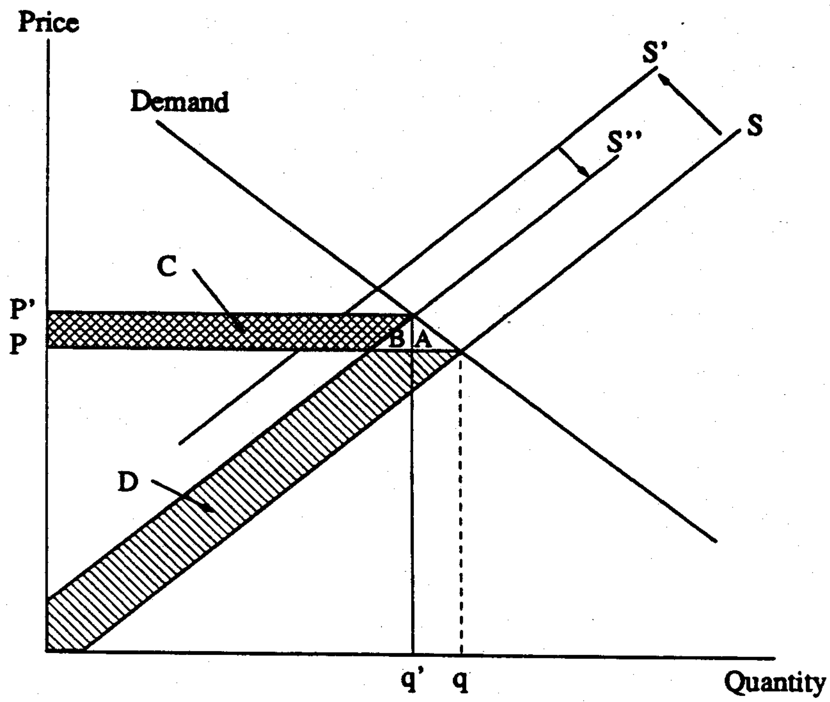

Figure 2.6 Changes in consumer and producer surplus in the pollock fillet market

Analysis of consumer surplus changes in the domestic surimi market were conducted using the same approach as for fillets. The change in industry surimi production predicted with each alternative and set of parameters was added to world production (400,000 mt), and changes in world price were calculated using a range of possible demand elasticities. Based on the elasticities identified for Japanese analog products, a range of -0.25 to -0.7 was used. This range is more inelastic than that used for fillets, which seems reasonable given that there are fewer close substitutes for surimi than for pollock fillets. This range corresponds to price flexibilities from -4.0 to -1.4. Thus a 1% increase in surimi production could produce up to a 4% reduction in price. The base price for the analysis was taken to be $1.30/lb, which was very close to the price used in both sectors in the cost-benefit model. The base U.S. consumption was assumed to be 36,000 mt, based on information provided by Steve Freese. The same approach was used as with fillets for considering different supply response to the price changes predicted by the initial change in quantity produced. Tables 2.18 and 2.19 summarize the estimated changes in domestic consumer surplus for surimi, based on these assumptions.

2.7.3 Consumer Impact Conclusions

It must be stressed that the results shown in Tables 2.16 through 2.19 are based upon very scant information regarding the nature of U.S. and world demand for fillet and surimi products made from pollock. Additionally, the analysis is based on a fairly simplistic modelling of the supply response for these products to changes in prices. A longer time-frame for conducting the analysis would have allowed for the realism of some aspects of the analysis to have been improved. However, it is also noted that even with the benefit of several months of work, a fair amount of uncertainty would have remained for many of the important elements of the analysis.

Generally, the size of the estimated consumer impacts was not affected greatly by use of the choice of parameter sets--either NMFS or industry. In comparing the ranges of estimated impacts, values from the same supply response column should be compared. The reason for this is that if a rise in the price of fillets elicits a large supply response to produce more fillets, it must at the same time shift a comparable amount of raw fish out of surimi production. Given the size of the initial price movements ($0.02-0.12/lb for surimi and $0.01-$0.06 for fillets) indicated for Alternative 3 by the demand elasticities chosen, it would seem reasonable to assume that the large-supply-response scenario is the most likely. The no-supply-response case should not be considered as a realistic possibility. Looking just at the change to consumers using the NMFS parameters, the range of loss in the fillet market is from $6.7 million to $10.4 million. In the domestic surimi market, the range of gain is from $3.1 million to $6.5 million. Thus, assuming that the true demand elasticities fall within the range modelled and that there would be a relatively large supply response to the initial price change, the potential loss in domestic consumer surplus could range from $200,000 to $7.2 million over the three-year period. Selecting the intermediate elasticity values for both products would yield a $4 million loss in consumer surplus. If the supply response is smaller, the effects could range from a $1.1 million gain to a $13.9 million loss, with a $7 million loss indicated by the use of the intermediate elasticity assumptions.

As noted above, domestic producer surplus will also be affected by the predicted price changes. In the case of fillets, roughly 35% of the surplus lost by consumers will be captured by domestic processors, with most of the rest being transferred to foreign producers. In the surimi market, since nearly all of the raw surimi sold in the U.S. is domestically produced, a high percentage of the gain experienced by consumers will be offset by a corresponding loss to domestic producers. Accounting also for these changes, the loss in surplus could run from $2 million to $6 million depending on the supply response and the demand elasticities.

Table 2.16 Changes in fillet production and domestic consumer surplus under Alternative 2, using NMFS and industry parameter estimates

Change in fillet production (mt), by sector and year

	NMFS parameter estimates			Industry supplied parameter estimates		
	year 1	year 2	year 3	year 1	year 2	year 3
Offshore	-2,274	-2,274	-2,274	-2,275	-2,275	-2,275
Inshore	1,231	1,231	1,231	1,214	1,214	1,214
Net change	-1,043	-1,043	-1,043	-1,061	-1,061	-1,061

Net present value of the 3-year change in domestic consumer surplus (CS)

	NMFS parameter estimates			Industry supplied parameter estimates		
	Supply response scenario			Supply response scenario		
Demand elasticity scenario	None	Moderate	Large	None	Moderate	Large
high (-1.0)						
total CS change	-$3,748,192	-$2,999,979	-$1,876,323	-$3,812,722	-$3,051,652	-$1,908,665
total CS change less the domestic PS change	-$1,317,656	-$1,053,697	-$658,160	-$1,340,443	-$1,071,912	-$669,530
medium (-0.75)						
total CS change	-$5,622,288	-$3,938,407	-$2,252,122	-$5,719,083	-$4,006,261	-$2,290,951
total CS change less the domestic PS change	-$1,976,484	-$1,382,697	-$789,632	-$2,010,665	-$1,406,594	-$803,271
low (-0.5)						
total CS change	-$7,496,385	-$4,502,106	-$2,252,656	-$7,625,444	-$4,579,690	-$2,291,504
total CS change less the domestic PS change	-$2,635,312	-$1,579,905	-$789,472	-$2,680,886	-$1,607,205	-$803,105

Table 2.17 Changes in fillet production and domestic consumer surplus under Alternative 3, using NMFS and industry parameter estimates

Change in fillet production (mt), by sector and year

	NMFS parameter estimates			Industry supplied parameter estimates		
	year1	year 2	year 3	year 1	year 2	year 3
Offshore	-5,619	-8,964	-1,230	-5,945	-9,615	-13,284
Inshore	3,041	4,851	6,661	3,171	5,129	7,087
Net change	-2,578	-4,113	-5,647	-2,774	-4,486	-6,197

Net present value of the 3-year change in domestic consumer surplus (CS)

Demand elasticity scenario	NMFS parameter estimates Supply response scenario None	Moderate	Large	Industry supplied parameter estimate Supply response scenario None	Moderate	Large
high (-1.0)						
total CS change	-$14,486,970	-$10,996,498	-$6,659,250	-$15,781,195	-$11,971,642	-$7,247,751
total CS change less the domestic PS change	-$5,166,619	-$3,902,879	-$2,350,240	-$5,638,231	-$4,254,516	-$2,559,907
medium (-0.75)						
total CS change	-$21,730,454	-$15,391,670	-$8,878,504	-$23,671,792	-$16,766,231	-$9,671,737
total CS change less the domestic PS change	-$7,749,929	-$5,456,939	-$3,130,169	-$8,457,347	-$5,951,445	-$3,412,128
low (-0.5)						
total CS change	-$28,973,939	-$19,049,588	-$10,355,641	-$31,562,390	-$20,764,459	-$11,293,592
total CS change less the domestic PS change	-$10,333,239	-$6,746,640	-$3,647,198	-$11,276,463	-$7,362,149	-$3,979,856

Table 2.18 **Changes in surimi production and domestic consumer surplus under Alternative 2, using NMFS and industry parameter estimates**

Change in fillet production (mt), by sector and year

	NMFS parameter estimates			Industry supplied parameter estimates		
	year1	year 2	year 3	year 1	year 2	year 3
Offshore	-3,693	-3,693	-3,693	-3,688	-3,688	-3,688
Inshore	5,365	5,365	5,365	5,294	5,294	5,294
Net change	1,672	1,672	1,672	1,606	1,606	1,606

Net present value of the 3-year change in domestic consumer surplus (CS)

Demand elasticity scenario	NMFS parameter estimates Supply response scenario None	Moderate	Large	Industry supplied parameter estimates Supply response scenario None	Moderate	Large
high (-0.7)						
total CS change	$1,688,323	$1,348,975	$841,532	$1,621,280	$1,295,471	$808,214
total CS change less the domestic PS change	$340,470	$271,590	$169,008	$326,844	$260,751	$162,290
medium (-0.4)						
total CS change	$2,954,566	$2,113,701	$1,226,595	$2,837,240	$2,029,907	$1,178,055
total CS change less the domestic PS change	$595,822	$425,262	$246,171	$571,977	$408,308	$236,397
low (-0.25)						
total CS change	$4,727,305	$2,829,314	$1,412,006	$4,539,584	$2,717,228	$1,356,168
total CS change less the domestic PS change	$953,316	$568,691	$283,108	$915,164	$546,055	$271,886

Table 2.19 Changes in surimi production and domestic consumer surplus under Alternative 3, using NMFS and industry parameter estimates

Change in fillet production (mt), by sector and year

	NMFS parameter estimates			Industry supplied parameter estimates		
	year1	year 2	year 3	year 1	year 2	year 3
Offshore	-9,123	-14,553	-19,984	-9638	-15,587	-21,536
Inshore	13,255	21,145	29,035	13,833	22,372	30,911
Net change	4,132	6,592	9,051	4,195	6,785	9,375

Net present value of the 3-year change in domestic consumer surplus (CS)

	NMFS parameter estimates			Industry supplied parameter estimate		
Demand elasticity scenario	Supply response scenario			Supply response scenario		
	None	Moderate	Large	None	Moderate	Large
high (-0.7)						
total CS change	$6,709,018	$5,145,489	$3,120,538	$6,909,817	$5,294,904	$3,209,009
total CS change less the domestic PS change	$1,388,395	$1,056,506	$634,273	$1,431,502	$1,088,075	$652,581
medium (-0.4)						
total CS change	$11,740,782	$8,403,693	$4,869,956	$12,092,181	$8,650,747	$5,010,944
total CS change less the domestic PS change	$2,429,691	$1,722,221	$987,946	$2,505,129	$1,774,205	$1,016,997
low (-0.25)						
total CS change	$18,785,251	$12,104,927	$6,473,185	$19,347,489	$12,468,191	$6,668,057
total CS change less the domestic PS change	$3,887,506	$2,474,186	$1,309,724	$4,008,206	$2,550,188	$1,349,645

Because the change in allocation is much smaller under Alternative 2, the consumer impacts are also less. Because the initial price response to the change in quantity is at most 1 to 2 cents per pound for both products, the moderate-supply-response scenario would appear to be the most likely. While the no-response scenario is, again, not a realistic alternative, it is much more likely with Alternative 2 that the "true" response could lie somewhere between no response and a moderate response. Assuming a moderate supply response, the estimated net loss in consumer surplus could range from $170,000 to $3.2 million, depending upon the demand elasticities. Choosing the middle elasticities modelled, the loss would be about $1.8 million over the three years. Adjusting these figures for offsetting changes in producer surplus due to the price changes indicates a net loss of between $500,000 and $1.3 million, with roughly a $1 million loss using both of the middle elasticity assumptions.

This analysis of potential consumer impacts is not intended to be the definitive treatment of the issue. Considerably more time would be needed for that. It will hopefully serve to illustrate the nature of some of the impacts that may occur beyond the processor level as a result of adopting either Alternative 2 or 3. The analysis demonstrates the types of tradeoffs that occur within markets for fillets and surimi when fish are transferred between sectors that have traditionally had differential rates of producing these products. Acknowledging the very limited information available for many aspects of the analysis, we have attempted to provide "ballpark" estimates of the magnitude of potential impacts, in order that their importance may be evaluated in a more informed manner.

2.8 Nonmarket Considerations

The foregoing estimation of economic value obtainable from the BSAI pollock fishery is based on the observable catch, and associated costs incurred and revenues obtained by the respective inshore and offshore components of the industry. The pollock fishery is a publicly owned resource, while the associated costs and benefits are those attributable to private firms. This creates the potential for a divergence between private economic value, and the public, or true national economic valuation. This divergence can occur in the case of a market failure, or *externality*, whereby the market system fails to reflect true social costs and benefits in the valuation of a resource in its private use. Indiscriminate water and air pollution by private firms are classic examples of market failure, in which case the private costs of polluting are smaller than the social costs born by the public at large. In the absence of pollution regulation, offenders find it more efficient to simply dump pollutants into the environment--creating significantly higher costs to downstream users--in order to avoid the more costly pollution control measures.

Attempts to resolve persistent allocation problems created by market externalities often requires regulatory intervention in the existing market. The objective of the regulatory intervention is to impose the true social cost or effective adverse consequences of the market failure on the firms or entities that capture the benefits. The mechanism for "internalizing" these costs varies in application according to the nature of the problem, including mandated pollution control procedures, user fees, or restrictions on permissible activities. Often, the effect of such regulation is to raise the cost incurred by the private firm or individual, thereby eliminating or reducing the incentive to continue the activity creating the externality.

The valuation of externalities or intangible public goods has proven a difficult and often controversial element in cost-benefit analyses. Where quantitative measurement of these values proves infeasible, it is appropriate to at least note the situation and suspected consequence for consideration by decision makers. Public comment on the inshore/offshore allocation of BSAI pollock has identified several areas in which there may be a divergence between the private industry valuation, and public valuation of the resource and its associated economic activity. These issues include: 1) the discard of pollock and bycatch species by the offshore sector; 2) the pollution of near shore waters from increased inshore pollock processing; 3) the social costs imposed by expanded shorebased economic activity in Dutch Harbor; and 4) possible increased marine mammal interactions created by greater near shore area.

While noted here, the ability of shorebased processing communities to absorb additional workers, and provide social services has been examined in Chapter 4 of the original SEIS, and is also addressed in Section 5 of this supplemental analysis. Similarly, Chapter 2 of the SEIS document explores the impact of increased shorebased harvest activity on marine mammals. Concerns about the discard of pollock were not directly examined in the SEIS, and the following discussion is intended to provide an overview of the issue as it relates to the consideration of net national benefits. Following this is a brief examination of the potential impact of near shore pollution by shore-based plants.

2.8.1 Discards

Bycatch and subsequent discards are a growing concern in fishery management. When significant portions of the resource are caught unintentionally and discarded, or disposed of due to a lack of processing capability, it detracts from conservation objectives fundamental to the Magnuson Act as well as Council management policy. The source of the discard problem appears to lie in the open access, first-come-first-served allocation system, rather than ignorance or neglect on the part of the fishermen and processors involved. Pollock discards are a significant portion of the total resource harvest, as reported in Section 1.5.4 (see Table 1.5). The discard of other species caught incidental to the target pollock fishery further compounds the issue. It is unclear, however, to what extent the discard problem may affect the cost-benefit results, without a more thorough investigation of the valuations placed on discarded fish, and the discard rates between the respective inshore and offshore sectors.

The cost-benefit analysis makes an explicit accounting for the reported discard of pollock. The value of this discard is considered to be the sum of those expenditures made by the firm on this discarded catch up to the point when it is disposed. It is possible, however, that the true social value of the pollock resource is greater than that incurred by the private catching or processing firm. The foregone products are denied to consumers as well as other fishermen and processors who may place a higher value on the discarded.

Publicly owned natural resources frequently lead to market failures because there is a poorly defined value of the resources in the market place. Where a market valuation of a publicly owned resource exists, such as the exvessel price for pollock, it might be presumed that this private value will accurately reflect social valuation. However, the market for the live pollock resource is not based on a conventional open exchange of property rights to the resource. Rather, access to pollock in the open entry, status quo environment is established by harvesting the resource as quickly as possible, which is likely different than its value to society. The resulting "race for fish" may encourage highgrading across both species and finished products, and the discard of lower valued or unwanted fish, covering both pollock and other species caught incidental to this targeted fishery. This is the dilemma characterized by the "tragedy of the commons" typical of common property resources. The public ownership and lack of private property rights discourages conservation practices by individuals.

In the pollock fishery, the problem may be further aggravated by a lack of processing capacity aboard catcher-processor vessels that would be necessary to utilize the lower valued resource without slowing the harvest rate for additional fish. The advantages of mobility held by catcher-processors may be limited, in this respect, by the logistical constraints inherent in self-contained at sea-operations, relative to less confined shore-based processors.

Thus, the discards also can be viewed from another perspective: 1) the unaccounted social costs created by the waste of the pollock through highgrading due to an accelerated pace of harvest in the overcapitalized pollock fishery, and 2) the relative efficiency of the respective sectors in physically utilizing the pollock available.

Unwanted fish may be discarded at low private cost, even though a more orderly harvest and processing effort would result in a higher value to society. This foregone value of the discarded product may not be properly represented in the quantitative cost-benefit estimates. As indicated in Table 1.3, the inshore sector also accounts for a significant discard of pollock and bycatch species, although at a lower rate than reported for offshore. The processing configuration of inshore operations may allow for higher utilization of delivered catch, resulting in a greater overall utilization of the roundweight tonnage. Discarding pollock also may be more costly to inshore plants if these plants incur a higher cost than offshore processors for roundweight tonnage. Also, inshore disposal costs are higher if discards must be processed in product reduction facilities. Combined, these factors would tend to increase processing costs to inshore plants, but increase utilization relative to offshore catcher-processors.

For both sectors of the industry, the physical waste of discards is a direct and inevitable consequence of overcapitalization and excess effort in the fishery, and the problem is likely to persist under the status quo. Allocations under Alternatives 2 and 3 may possibly exacerbate discard by offshore catcher-processors, if reduced allocations intensify the race for fish among competing vessels. Alternatively, the preferential allocations of the pollock TAC to the inshore sector may lead to steady or lower discard rates as a result of stabilized operations under a more certain apportionment of the pollock resource.

To the extent that the discard of pollock reflects private costs that are lower than true social valuation of the resource, the quantitative estimates of aggregate benefits to the nation may be overstated. Moreover, if the divergence between private and social costs exists, and if the offshore discard rate is significantly higher than the comparable inshore rate, the estimates of net economic benefits attributed to the offshore sector will be biased upwards by this difference.

2.8.2 Marine Pollution from Processing Plants

Concentrated, large scale pollock processing in a single location such as Dutch Harbor has led to concerns and allegations that improper disposal of processing waste may represent a hazard to the marine environment. This scenario is the classic pollution externality whereby private costs of waste disposal are less than the social costs associated with a polluted environment. Social costs in an unregulated case might include the related adverse impacts on marine life, hazards to human health, and reduced water quality.

National concerns over environmental quality have evolved to the point that pollution is closely regulated, routinely mandating pollution control measures and imposing the cost of such controls on those firms or individuals creating the pollution. The intent has been to "internalize" the cost or consequences of a market failure on the offending party, and thereby raising private costs. Shorebased groundfish processors in Alaska are regulated by both the State and Federal governments to ensure compliance with such guidelines.

In the case of Dutch Harbor, there have been allegations that processing waste have adversely affected the marine environment in this location. It is unclear whether the allegation is directed towards a failure of the environmental regulation process and the agencies involved, or a more general concern over the amount of processing activity occurring in the Dutch Harbor area. The regulation of processing waste is largely outside the scope of fishery management plans developed by the Council, although inadvertent aggravation of environmental problems would be a concern in consideration of optimum yield. In either case, the quantitative estimates of net national benefits arising from inshore Dutch Harbor processing may understate the true costs to society, if the pollution externality represented by processing waste has not been effectively internalized through existing environmental regulations.

APPENDIX 2A Inshore Harvesting and Processing Costs and Returns Data

Basic cost and earnings, and catch and processing data for the catcher vessels and shore-based processing plants comprising the inshore sector come from a number of sources. Representative operational profiles used in the economic impact, input-output analysis of the proposed inshore/offshore allocation alternatives (North Pacific Fishery Management Council, 1991) were determined to contain the best information available on inshore harvesting and processing costs. The operational profiles provide itemized cost, earnings and production (harvests by species for catcher vessels and processed product amounts for processing plants) data representative of each type of catcher vessel and processing plant making up the inshore sector. The operational profiles were developed using economic data for 1989, which were collected through an industry survey referred to as the "OMB Survey," together with NMFS records on catch and processing statistics (North Pacific Fishery Management Council, 1991).

The operational profile for the inshore catcher trawler is shown in Table A. The operational profile for the shore-based processing plant is shown in Table B.

Table A. Operational Profile for the Inshore Catcher Vessels

Product Name	Quantity	Price	Total Value
Pollock Surimi	16535851.7	$0.08	$1,322,868
Cod	1265049.0	$0.15	$194,818
Totals	17800900.7		$1,517,686

Variable Expenses		
Vessel/Engine Repair	$147,747	
Gear Repair/Replace	$96,125	
Fuel & Lubricants	$121,046	
Food & Supplies	$17,801	
Ice & Bait	$0	
Dues & Fees	$0	
Transportation	$1,780	
Miscellaneous	$0	
Crew Shares	$546,367	
Total Variable Expenses		$930,866

Fixed Expenses		
Insurance	$115,000	
Moorage	$0	
Interest Expense	$92,700	
Licenses	$3,100	
Miscellaneous	$100,000	
Total Fixed Expenses		$310,800
Total Expenses		$1,241,666
Net Income		$276,020
Average non-labor variable cost		$0.021/lb
Crew share		.36

Table B. Operational Profile for the Shore-based Processing Plants

Product Name	Quantity	Yield	Price	Total Value
Pollock Surimi	175,085,489.0	31515388.0	$0.80	$25,212,310
Pollock Roe	602,185.0	602185.0	$2.52	$1,517,506
Cod Salt Fillets	17,516,063.0	5079658.3	$1.42	$7,213,115
Meal/By-Products	7,463,532.0	7463532.0	$0.27	$2,015,154
Halibut H&G	512,864.5	502607.2	$2.20	$1,105,736
Sablefish H&G	386,176.5	378453.0	$2.07	$783,398
King Crab	1,003,460.5	662283.9	$8.50	$5,629,413
Bairdi Crab	1,272,474.5	844923.1	$4.47	$3,776,806
Opilio Crab	7,977,746.5	5169579.7	$2.24	$11,579,859
Halibut FLL H&G	400,000.0	392000.0	$2.20	$862,400
Totals	212,219,991.5	52610610.2		$59,695,697

Variable Expenses		
Net Cost after shrink	$31,952,847	
Manufacturing Labor Cost	$6,444,090	
Direct Materials Cost	$2,847,381	
Manufacturing Overhead	$4,998,696	
Fish Taxes	$662,857	
Bad Debt Expense	$0	
Total Variable Expenses		$46,905,871

Fixed Expenses		
Admin Salaries	$715,000	
Maint. & Repairs	$1,641,000	
Utilities	$1,321,000	
Telephone	$0	
Insurance	$426,000	
Bus./Prop. Taxes	$195,000	
Admin. Supplies	$1,139,000	
Misc. Administr.	$733,000	
Interest Expense	$939,000	
Depreciation	$5,480,000	
Total Fixed Expenses		$12,589,000
Total Expenses		$59,494,871
Net Income		$200,825
Average non-raw product variable cost		$0.27/lb

APPENDIX 2B   Matrix of Estimated Changes in Net Benefits

Tables C and D below permit an evaluation of changes in net benefits for different inshore/offshore allocation combinations over the 1993-95 period, within the 30/70 - 45/55 range:

Table C. **Change in Net Benefits and discounted net benefits for Specific allocation - year combinations based on INDUSTRY estimates.**

	Year		
Change in Net Benefits for Specific Allocation - Year Combinations			
Allocation In/Off	1993	1994	1995
30/70	(6.1)	(6.1)	(6.1)
35/65	(16.1)	(16.1)	(16.1)
40/60	(26.0)	(26.0)	(26.0)
45/55	(35.9)	(35.9)	(35.9)
Discounted Change in Net Benefits for Specific Allocation - Year Combinations			
30/70	(5.9)	(5.6)	(5.3)
35/65	(15.3)	(14.6)	(13.9)
40/60	(24.7)	(23.6)	(22.4)
45/55	(34.2)	(32.5)	(31.0)

Table D. **Change in net Benefits and discounted net benefits for specific allocation - year combinations based on NMFS estimates.**

	Year		
Change in Net Benefits for Specific Allocation - Year Combinations			
Allocation In/Off	1993	1994	1995
30/70	(8.1)	(8.1)	(8.1)
35/65	(20.0)	(20.0)	(20.0)
40/60	(31.9)	(31.9)	(31.9)
45/65	(43.8)	(43.8)	(43.8)
Discounted Change in Net Benefits for Specific Allocation - Year Combinations			
30/70	(7.7)	(7.3)	(7.0)
35/65	(19.0)	(18.1)	(17.3)
40/60	(30.4)	(28.9)	(27.5)
45/55	(41.7)	(39.7)	(37.8)

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3.0 ECONOMIC IMPACT ANALYSIS

The purpose of the economic impact analysis is to examine the distribution of key economic consequences across affected locations that occur as a result of the proposed changes in the allocation of BSAI pollock under Amendment 18. As detailed in the original SEIS, an impact assessment model was designed as a part of the inshore/offshore analysis to measure impacts on direct income, total economic activity, and employment associated with changes in the Alaska groundfish industry. The analytical design utilizes a disaggregated input-output model of affected local, regional, and national economies.

3.1 Revisions to the Original Model

The economic parameters describing the catching and processing activity of the groundfish fleet in the SEIS were developed based on a 1990 survey of the industry that described primarily 1989 cost, revenue, and operating conditions. In order to provide a more current perspective on economic conditions, as well as establish a common point of reference with the cost-benefit analysis, the cost, revenue, harvest, and processing data was updated to 1991. Thus, both components of the economic analysis rely upon the same data concerning catch, shares, costs, revenues, product mix, recovery rates, and discards, with minor exceptions. For example, the economic impact assessment model relies upon specific cost and revenue budgets of separate catcher-processors classes, rather than an composite vessel estimate as used in the cost-benefit model.

Revisions made to the economic impact model did not have available the same detailed operating data gathered for the original analysis. Cost data from 1989/90 were adjusted to 1991 levels based on the Producer Price Index (PPI), rather than empirical information. Product prices and processing efficiency were updated based on the best available data, including alternative NMFS and Industry data scenarios, as discussed previously. The model also was modified to reflect the subsequent addition that has occurred since 1989 of both catcher-processor vessels, catcher vessels, motherships, and shorebased processing plants. Although incidental to the pollock fishery, the relative dependence of harvesters and processors on other species has a direct impact on operations and profitability. Proportional changes in the catch and prices of other important species, such as crab and flatfish, were incorporated into the revised version of the economic impact assessment model. However, available time and data did not permit extensive verification of these changes.

The scope of the model was modified to include economic impacts arising from the inshore/offshore allocation of the pollock fishery in Bering Sea/Aleutian Islands fishery management area. The analysis thus excludes harvesting and processing operations in the Gulf of Alaska, as well as economic activity associated with Western Alaska Community Development Quota program.[1]

3.2 Changes in the Economic Environment

The economic impact model was run over the two alternative scenarios developed by the analytical team. While there are important differences between the NMFS and Industry data assumptions, the revision from the 1989/90 base to the 1991 base results in changes that are many times greater than the differences between the NMFS and Industry scenarios. Generally, product prices and recovery rates used in this supplementary analysis are significantly higher than those that existed in 1989. For example, reported

[1]As a part of Amendment 18 authorized by the Secretary, 7.5 percent of the BSAI pollock TAC is to be made available for economic development by native communities along the Bering Sea in Western Alaska. The economic consequences of this allocation have been addressed previously in the SEIS, and are not discussed here.

offshore surimi recovery rates increased nearly 30 percent, and surimi prices increased over 50 percent. Although recovery rates and prices increased dramatically between 1989 and 1991, production costs have been relatively small, at least as captured by the PPI, which suggests a nominal 4 percent increase in producer costs since 1989. The combined affect of these effects has been to significantly increase the net returns to both inshore and offshore operators--processors in particular, since exvessel pollock prices had shown only modest gains during this time. Secondly, the relative change from 1989 to 1991 in recovery rates and product prices between the inshore and offshore sectors has been variable in response to changes in competition, plant operations, technology, and resource availability. As a consequence, the results of the inshore/offshore allocation alternatives as examined in this supplementary analysis are often different than those developed in the original SEIS based on 1989 conditions.

3.3 Impacts on Direct Income

Fundamentally, the impact of the proposed alternatives is to preferentially allocate some portion of the BSAI pollock TAC from the offshore sector to the inshore sector. The economic impact model traces the effects of this incremental change in pollock tonnage as it is taken away from the offshore sector, and added to the inshore sector. The income and employment impacts resulting from the additional inshore tonnage and revenues are compared to the impacts arising from the offshore loss, and associated with the economic level or locations where these impacts will occur. The comparisons presented in the following figures, therefore, are the respective economic impacts of an equal tonnage of fish between the inshore and offshore sectors, by specific location. The following Figures 3a through 3c illustrate the estimated impacts in terms of the change in direct income, arranged from the base case 1991 scenario (indicating no change), up through the four alternative allocation options considered in Alternatives 2 and 3. Because the estimation procedure employed in the economic impact model is linear, the change in results is proportional to the change in the underlying allocation.

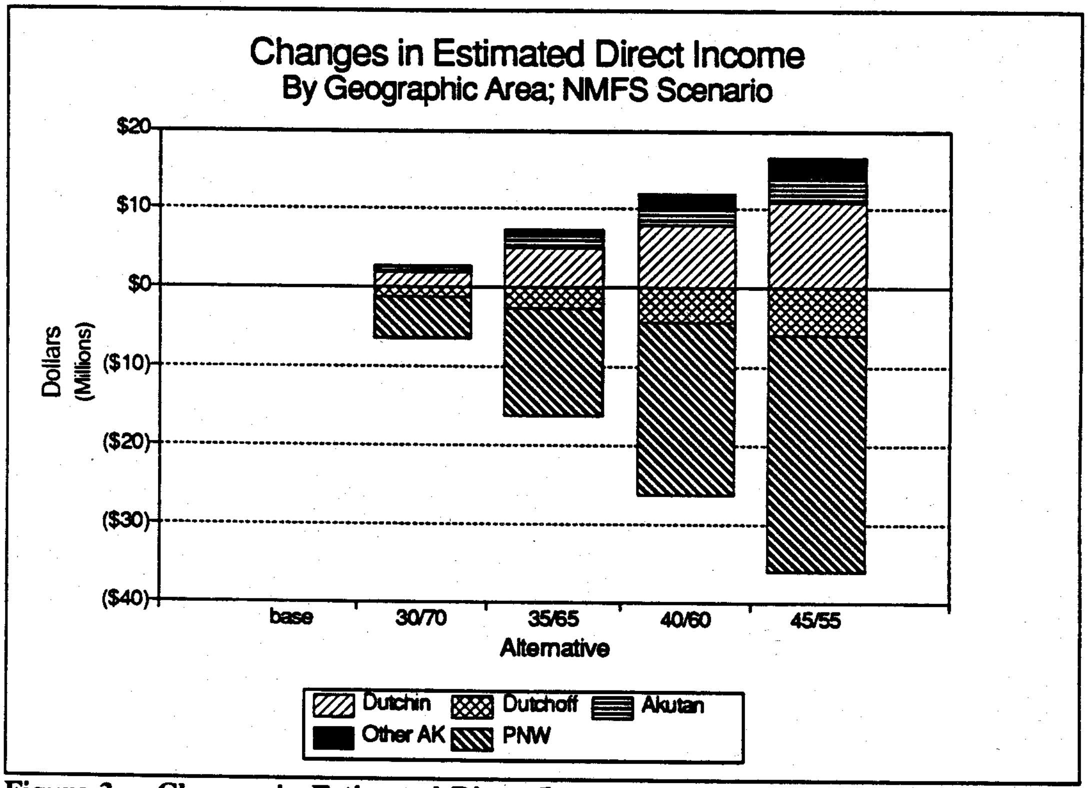

Figure 3a. Changes in Estimated Direct Income by Location; NMFS Scenario

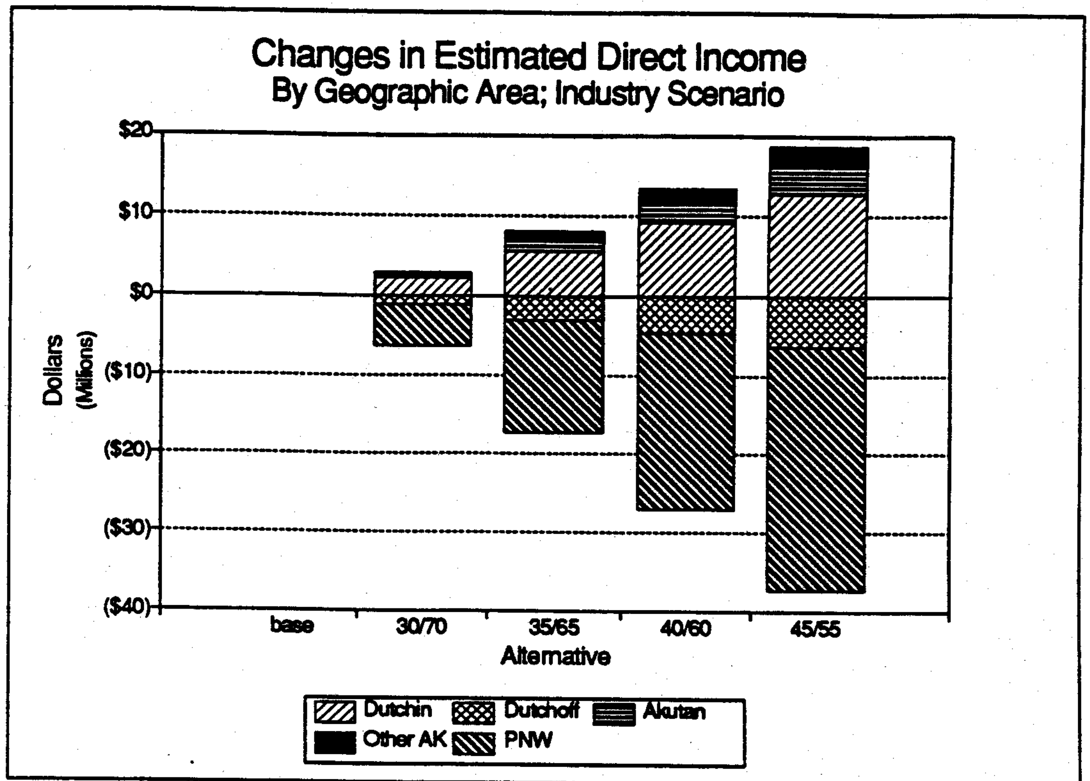

Figure 3b. Changes in Estimated Direct Income by Location; Industry Scenario

Figure 3a compares the relative changes in direct incomes estimated to result from the respective allocations percentages compared to the base 1991 resource shares, using the NMFS data scenario. Figure 3b presents the same estimates based on the Industry data scenario. A complete tabular listing of these results, by location, is included in Appendices 3A and 3b. Locations specified in the analysis include Dutch Harbor, Akutan, other Alaska locations, and the Pacific Northwest (PNW). The greatest income impacts are incurred by the PNW, followed by inshore Dutch Harbor, offshore Dutch Harbor, Akutan, and other Alaska. As developed in the SEIS, the PNW is a broadly defined economic region, generally represented by Seattle, although numerous cities and smaller communities are included in the regional impacts. Seattle is the home port and headquarters for much of the offshore industry, as well as a significant part of the inshore processing industry. Although Seattle and the PNW are often considered as the economic location of the offshore fleet, both components of the industry have important economic ties in the PNW.[2] Similarly, Dutch Harbor serves both the inshore and offshore components, and the respective inshore and offshore dependencies have be estimated for this port in order to distinguish between operations of the two components.

For both Figures 3a and 3b, the effect of the preferential allocations is to increase the direct incomes accruing to inshore operations in Alaska proportional to the size of the inshore allocation, at the expense of offshore operations in Alaska, and the PNW in general. The offshore losses in direct income are relatively greater than the inshore gains, resulting in a net loss in direct incomes. The aggregated change across these five locations, by allocation alternative, is shown in Figure 3c. Direct income calculated in the model aggregates direct wages, salaries, and profits resulting from harvesting and processing pollock.

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[2]Based on the expenditure and distribution assumptions used in the economic impact model, approximately 25 percent of the direct income accruing to the PNW in the base case (status quo) is attributable to Dutch Harbor and Akutan inshore catching and processing operations.

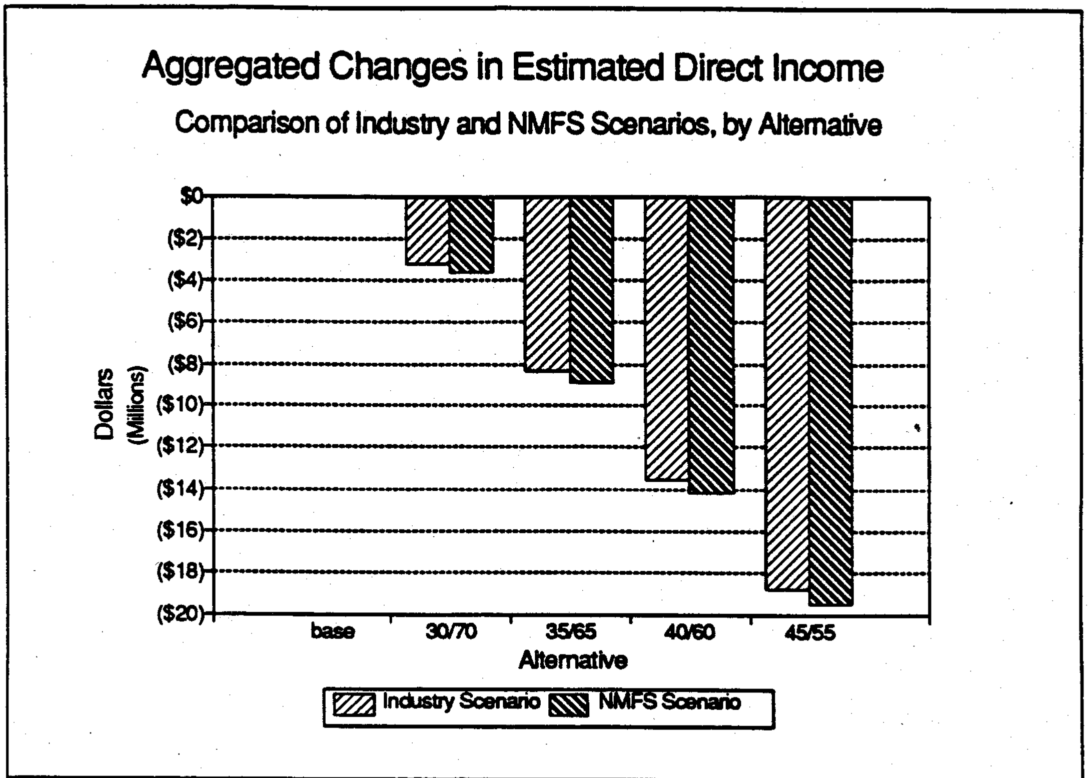

Figure 3c. Aggregated Changes in Estimated Direct Income

This accounting of total direct incomes is different than the economic valuation of producer surplus based on opportunity costs. The estimates of direct income in both the base case and the alternatives likely differ from the true producer surpluses involved, as estimated in Section 2.

The economic impact model captures all direct income initially at the local, state, or regional level, and adjusts the income and other expenditure values for estimated subsequent payments to foreign owners or workers. The estimates illustrated in these figures reflect the calculated incomes after deducting foreign payments. Estimates of foreign ownership and payments are discussed and reported in the original SEIS. The impact of deductions for foreign payments is substantial for both sectors. Using the base case allocation results, roughly 29 percent of direct income accruing to the inshore sector (totaling nearly $65 million) was calculated as payments to foreign interests and deducted from total incomes. For the offshore sector, approximately 20 percent of direct income ($98 million) was estimated to be payments to foreigners, and subtracted from the total in arriving at the results shown in these figures. Similar adjustments were made for calculated employment impacts, where the estimated FTE impacts were based on the opportunity cost of the foregone employment. Adjustments to the employment impacts resulted in the deduction of 16.7 percent of the inshore sector total results as foreign leakage, and 13.4 percent of offshore sector totals.

The differential adjustments between the inshore and offshore sectors for foreign payments affect the results presented here in that proportionately more of the offshore impacts--generally losses in direct income--are captured in the results compared to the inshore sector. To a lesser extent, the results will also be affected by the level at which the direct incomes accrue. Payments to foreign interests are generally higher for inshore processing than for inshore catching activities. Thus, the respective profitability of catching and processing, as determined by variables such as the exvessel and finished product prices in a given year, will affect the relative proportions of direct income that accrues domestically.

The impact of the NMFS versus Industry data scenarios on direct income is somewhat ambiguous, given the seeming significance of the changes in certain key variables. Only small difference in the estimated impacts are indicated, based on the two data scenarios. Both inshore and offshore location incomes appear slightly higher in the Industry scenario. The total direct income estimates accruing to the industry are approximately $535 million using the NMFS values, and $561 million based on the industry numbers. The difference across the alternatives between sectors, however, is relatively small (less than $1 million), even at the maximum 45/55 percent reallocation, as illustrated in Figure 3c. This suggests that the income impacts on each sector created by higher price and recovery rate assumptions may be offsetting each other. In addition, a significant portion of increased net returns accrues to foreigners for both sectors, such that only part of calculated increases (or decreases) in profit levels will be reflected in the domestic inshore/offshore comparison illustrated in these Figures.

3.4 Impacts on Employment

The economic impact model assesses the total direct, indirect, and induced economic activity resulting from revenues generated by catching and processing pollock.[3] As a proxy for the employment effects of this dollar-based economic activity, total dollar impacts are divided by the average income in a given economic location to estimate full time equivalent (FTE) jobs. The resulting employment estimates include the indirect and induced employment impacts, as well as the direct impacts in the catching and processing sectors. That is, the changes in employment created by the allocation alternatives extend to a broader population than just the labor employed onboard vessels or in plants. The FTE estimates presented here are predicated on the total economic impacts of the proposed allocations, assessed at the average wage across all vocations in a given location. As such, the aggregated employment impacts do not allow for the examination of direct pollock harvesting or processing jobs. Average annual 1991 incomes used in the calculations were developed from Bureau of Labor Statistics data as follows: Dutch Harbor, $27,528; Akutan, $23,088; Alaska $30,060; PNW $23,750; and U.S. $25,764.[4]

Since the income level is an average of the community or area, it reflects the different jobs and wage levels that will be influenced by changes; not just employment in the pollock catching and processing industry. The estimate of FTE is not necessarily the same as jobs, since FTEs are often spread out as small parts of many different workers, or, in the case of fishing and processing, concentrated in a fewer number of workers employed on a longer-than-normal work week. Moreover, the indirect and induced economic impacts estimated based on the input-output coefficients may evolve over span of several years. The estimated employment gains and losses are unlikely to occur predictably within a given year. As noted in the SEIS, caution and qualification are appropriate in assessing likely employment impacts based on this approach, particularly when applied to aggregated data. Relative comparison of affected FTEs may be more appropriate than absolute associations.

The distribution of estimated FTE employment impacts is illustrated in Figures 3d and 3e, for the NMFS and industry scenarios, respectively. FTE gains are indicated for the specific inshore locations as the allocation of pollock inshore is increased, and FTE losses result for the PNW and offshore Dutch Harbor. FTE losses in the PNW appear proportionately much larger than FTE gains in Alaska. This is partially due to the difference in annual incomes between Alaska and the PNW, as reported above, but the result is consistent with the estimated decline in PNW direct income noted in Figures 3a and 3b. The significant

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[3]Section 3.1.2 of the SEIS describes the input-output logic and methodology used to generate these economic values.

[4]Final 4th quarter earnings reports for 1991 have not yet been released. The income figures are adjusted annual estimates, based on the first 3 quarters of 1991.

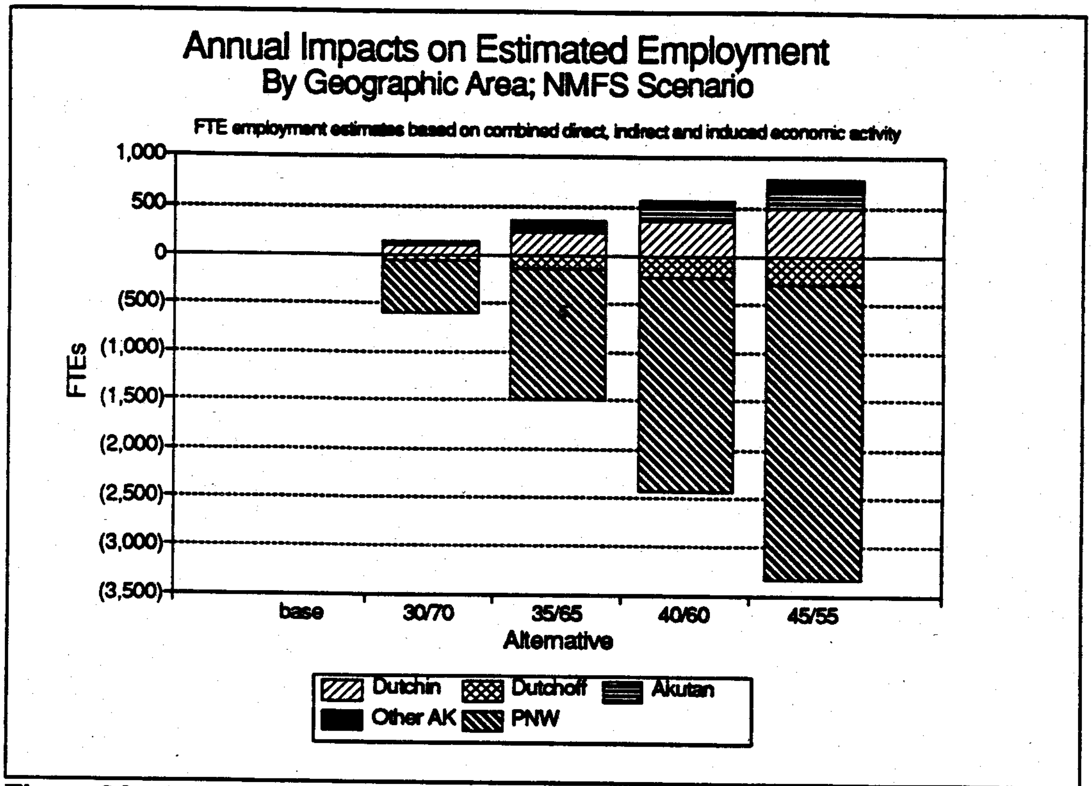

Figure 3d. Annual FTE Employment Impacts by Location; NMFS Scenario

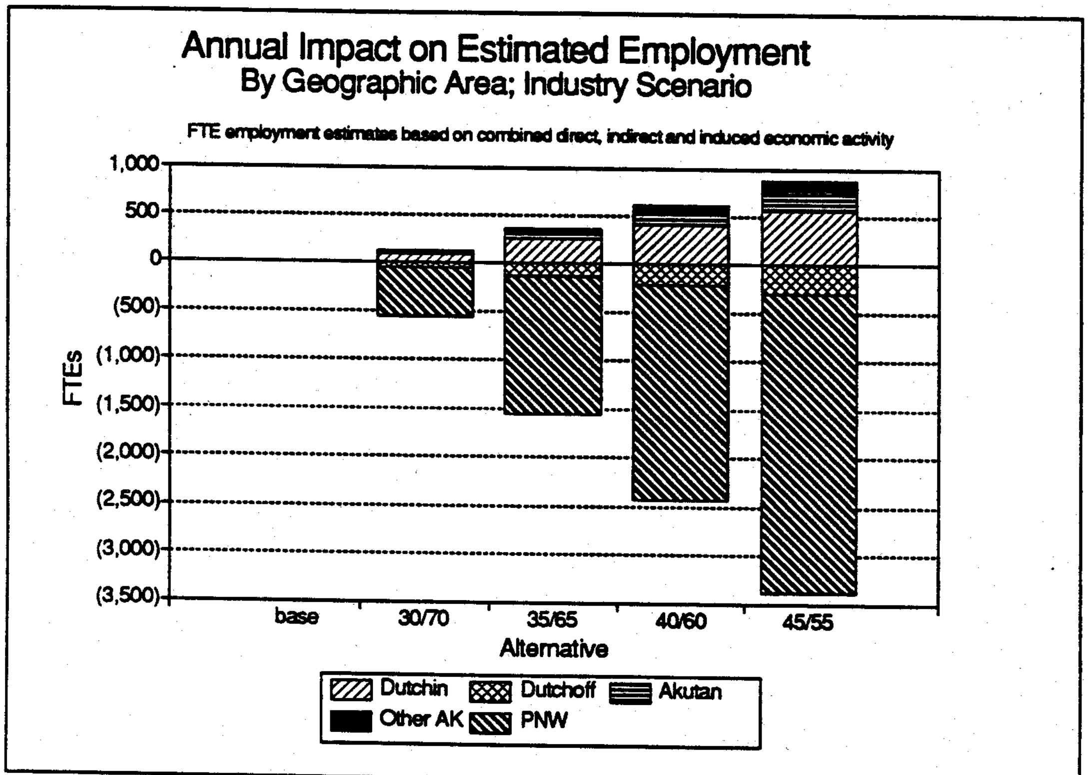

Figure 3e. Annual FTE Employment Impacts by Location; Industry Scenario

loss in PNW FTEs underlies the importance of indirect and induced economic activity generated by the direct fishing and processing operations. The indicated net loss in FTE is proportionately greater than the loss in direct income because of the inclusion of indirect and induced economic activity created by subsequent respending in the economy, thereby affecting a wider range of employment than just that involved in the direct fishing and processing activities.

Estimated employment impacts can also be aggregated across all locations, in order to develop an aggregated or net impact. Unlike direct income, indirect and induced economic impacts extend beyond the initial fishing and processing activity, and continue to generate additional economic activity as respending continues throughout the U.S. economy. The extent and magnitude of these impacts are determined by the input-output coefficients specified in the model. Foreign leakage is taken into account by subtracting estimated expenditures to foreigners from the domestic impacts, as explained in Section 3.3. An estimated 13.4 percent of total offshore employment is represented in payments to foreign interests, and 16.7 percent of total inshore employment. The employment estimates shown in Figures 3d, 3e, and 3f exclude this foreign leakage.

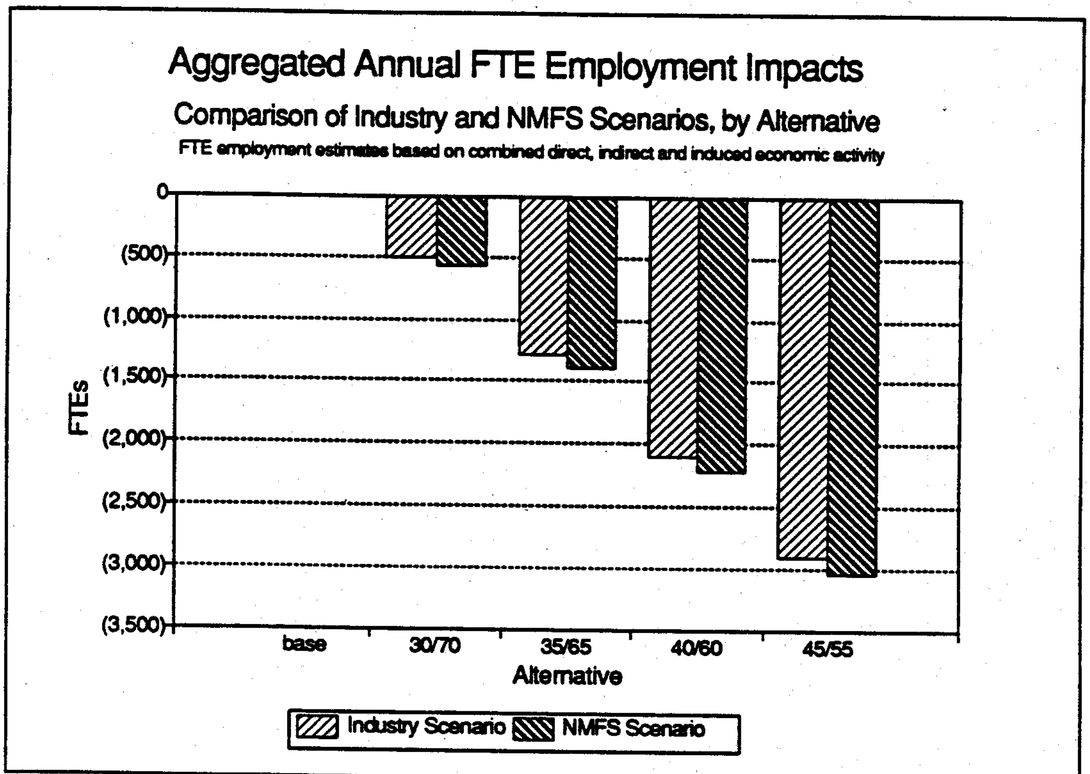

Figure 3f. Aggregated Annual FTE Employment Impacts

The aggregated FTE employment impact estimates are shown in Figure 3f. The estimates in Figure 3f are net employment impacts; the total FTE employment is much larger than the net changes indicated. The total FTE employment calculated for the nation in the base case is roughly 85,000 (see Appendices 3A and 3B). As in the case of direct income, there is little apparent difference in the estimated impacts on FTE employment due to variations in the NMFS or Industry data assumptions. The NMFS FTE impacts are slightly greater than those generated by the Industry scenario. Changes in price and recovery rate impacts made in the Industry scenario do not appear to have altered the relative economic impacts. As with the direct income results, it is likely that changes made in one sector were balanced to some extent by changes made in other.

3.5 Summary of Impacts by Alternative

Figures 3a through 3f illustrate the income and employment impacts by location for a range of incremental divisions of the BSAI pollock TAC between the inshore and offshore sectors. The allocation alternatives specified by the Council cover two specific options: 1) the 30/70 split for all three years; and 2) a phased increase in the inshore allocation of 35/65 in year 1, 40/60 in year 2, and 45/55 in year three. The impacts of the catcher vessel operational zone are analyzed separately in Section 4.

3.5.1 Alternative 1

The original analysis of the status quo (Alternative 1) as contained in the SEIS traced the historical development and subsequent overcapitalization of fishing and processing effort in the pollock fishery. The consequences of overcapitalization are a major factor contributing to the preemption problem defined by the Council, and are examined at length in the SEIS. In this supplemental analysis, the base case economic environment has been updated from the 1989 conditions to 1991, and is modeled as a reference for evaluating the allocations proposed by the Council. Alternatives 2 and 3, as well as the consideration of a harvest vessel operational zone examined in Section 3, are the proposed actions for resolving the problems recognized in the status quo.

3.5.2 Alternative 2

As explained in the discussion of the information base in Section 1, the actual inshore and offshore shares of the pollock TAC vary depending upon the product recovery rates applied to the output figures available from processor product reports. The status quo base inshore and offshore TAC shares are thus dependent upon the accuracy of the product recovery rates applied to estimate the appropriate round weight. Since the impacts of the proposed allocation shares are based on changes from this status quo to the specified shares, the magnitude of the change will be dependent to some extent upon the assumed status quo.

In the case of Alternative 2, the 30/70 split, the calculated impact is based on the status quo shares of 26.6 percent inshore and 73.4 percent offshore for the NMFS scenario, and 26.9/73.1 percent for the industry scenario. Note that these are different than the shares calculated using reported catch for 1991, which produces an inshore/offshore split of 29.5/70.5. Under the assumptions and data scenarios used in the analysis, Alternative 2 would result in relatively modest shifts in direct income and employment away from the offshore sector to the inshore sector. The annual direct income gains to the combined inshore Dutch Harbor, Akutan, and other Alaska locations is estimated to be about $3.2 million, accompanied by an annual increase of approximately 150 FTEs.[5] The impact on the combined offshore sector is estimated to be a loss of roughly $6.5 million annually in direct income, and 600 FTEs. Recall that the aggregate direct income impacts accrue initially in the Alaska and PNW locations, while the FTE impacts are nation wide.

Over the three year duration of the proposed allocation, the annual economic impacts estimated using this methodology would remain the same, in that no subsequent adjustment by catchers and processors is accounted for in the model. The present value of the three year cumulative change in direct income stream, assuming a 5 percent real social discount rate is a gain of approximately $8.7 million for the affected inshore communities, and a loss of $17.9 million for the offshore locations. The FTE employment estimates are regarded as annual employment effects each year of the allocation, but the yearly jobs

[5]The direct income and FTE estimates are the midpoints between the NMFS and Industry data scenarios. As illustrated in Figures 3c and 3f, the aggregate differences between the two NMFS and Industry scenarios is relatively minor in terms of these calculated impacts.

represented are not additive over time, so the FTE effects are as noted in the paragraph above. That is, the inshore employment gains are 150 FTEs over the duration of the allocation, not a cumulative 450 FTEs. The apparent net impact to the nation over the three year period is a loss of $9.3 million in direct income, and 530 FTEs. The summary three year cumulative direct income and employment impacts for Alternatives 2 and 3 are listed in Table 3.1; numbers in parenthesis are losses (negative).

3.5.3 Alternative 3

Alternative 3 proposes successively larger allocations to the inshore sector, starting from a 35/70 split, and increasing by five percent of the TAC in each of the next two years. The annual direct income and employment impacts increase proportionately as a result, as illustrated in Figures 3a through 3f. The present discounted value of the inshore gains is $34.9 million, accompanied by an increase of roughly 530 FTEs. The corresponding offshore loss is approximately $72.6 million, and 2,160 FTEs, resulting in a net national loss of $37.3 million in direct income, and 1,885 FTEs. The FTE estimates reported for Alternative 3 are the weighted average employment effects over the three year period.

Table 3.1 Cumulative Direct Income and Employment Economic Impacts

Sector/Impact	Alternative 2	Alternative 3
Inshore		
Income ($)	8,626,712	34,927,721
FTEs	149	533
Offshore		
Income ($)	(17,919,409)	(72,604,958)
FTEs	(601)	(2,159)
Cumulative a/		
Income ($)	(9,284,696)	(37,322,311)
FTEs	(530)	(1,885)

a/ The calculated cumulative income and employment effects are not necessarily the simple difference between the values estimated for the inshore and offshore locations, due to some offsetting impacts between the two sectors in Dutch Harbor and the PNW.

3.6 Interpretation of Results

The rationale for establishing set allocations of the BSAI pollock TAC between the inshore and offshore sectors is provided in the SEIS. Generally, the allocations are intended to prevent preemption of stationary shorebased processors by the mobile offshore catcher-processor fleet. Establishing dedicated allocations is expected to provide more certainty of pollock availability to the inshore component, and reduce conflicts between the two sectors in an industry already frustrated by overcapitalized effort. The basis for the respective inshore and offshore share allocations has been the subject of considerable discussion, involving judgements over past participation and catch histories, capacity, efficiency, future intentions, and alternatives available. Different perspectives on the rightful entitlement of each sector to a given share of the TAC are at the heart of the inshore/offshore controversy, and there is unlikely to be a universally acceptable allocation, particularly in view of the overcapitalized effort that may be as much as twice the current availability of the pollock resource.

The estimated direct income and FTE employment impacts indicate that the preferential allocation of the pollock resource will lead to greater benefits for the inshore sector. Such redistributions, however, create proportionately larger losses for the offshore sector, relative to the economic conditions assumed to exist in the status quo base situation. The magnitude of the respective gains and losses is directly proportional to the share of the TAC preferentially allocated inshore. The magnitude of protection from preemption offered to the inshore sector comes at a cost to the offshore components of the industry, as well as the nation at large under these assumptions. However, a careful understanding of the data and other assumptions used in the analysis is important when applying the results.

The level and composition of economic impacts are dependent upon the data and variables used to develop the estimates. Although two different data scenarios were used in the analysis, the difference in the results was relatively minor in comparison to the magnitude of the overall values calculated. It was anticipated that economic results would be sensitive to the product price and recovery rate assumptions used. Changes in the price and/or recovery rate of key products such as surimi directly influence the estimated income and employment impacts. To illustrate the sensitivity of the results to such changes, a ten percent increase in pollock surimi price and recovery rate was simulated for both the inshore and offshore Dutch Harbor components. These simulations were conducted using the status quo inshore/offshore split between in pollock shares, and industry scenario data assumptions.

The estimated impact of the ten percent price increase from the base scenario resulted in a 5.6 percent increase ($22 million) in estimated direct income in the offshore sector, and a 4.4 percent increase ($4.4 million) increase inshore. The ten percent increases in recovery rate raised offshore incomes 4.7 percent, and 4.4 percent inshore. Combining the price and recovery rate increases generated a 10.9 percent increase in offshore incomes, and 9.2 percent inshore. These findings illustrate the sensitivity of the calculated impacts of the alternative allocations to the data inputs used. That there were only relatively minor difference in the estimated impacts based on the NMFS and Industry data scenarios suggests that the changes to the inshore and offshore sectors in the model likely had a balancing, or offsetting impact on the results. This does not mean that the findings are insensitive to changes in the underlying data assumptions; rather, that the calculated results will reflect the relative as well as absolute level of data assumptions applied to the two respective sectors.

The economic impacts estimated in the SEIS relied upon the same model and design as employed in this supplementary analysis. Certain generalities in the results are also the same; inshore gains to Alaska communities come at a disproportionate cost to offshore locations, particularly in the PNW. However, the aggregated national losses estimated in the 1991 model appear to contradict the findings of the original SEIS. In this latter regard, the results are sufficiently different as to warrant some examination.

It appears that the economic health of the inshore and offshore pollock industry in 1989 was depressed, partially as a result of low product prices for surimi and fillets. The considerable increase in finished product prices in 1991 relative to 1989 has dramatically increased the net returns to processors, particularly, based on comparison of calculated costs and returns in the two years. Other things equal, increases in net returns to the vessels and plants involved will increase the size of the economic impacts. Thus, the estimated economic impacts will be proportional to the economic conditions in the base year used to measure potential changes. If the increases in prices and recovery rates were perfectly balanced for both inshore and offshore sectors, the relative results would remain the same. The findings presented here suggest that this has not been the case, however, as the projected adverse impacts on the offshore sectors have increased relative to inshore gains.

At least two explanations are available to resolve this difference in the 1991 and 1989 results. First, the offshore sector may have increased its relative profitability (compared to inshore operations) since 1989 in terms of higher prices, greater product recovery, improved cost efficiency, and better product quality. Inshore operations may have also improved performance in these areas, but the explanation is that the offshore components has been even more successful. A second explanation may be that the cost, revenue, and operations data used in this or the original analysis may be sufficiently inaccurate as to distort the results compared to what actually happened. Presumably, both factors--changes in operating efficiency and data problems--could also be present in these results. In either event, it is important to view the quantitative results with some degree of caution in drawing definitive conclusions.

Appendix 3A Summary Economic Impacts by Location and Alternative; NMFS Data Scenario

1. Dutch Harbor Inshore	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$20,330,329	$22,362,429	$2,032,100	$25,343,736	$5,013,407	$28,325,044	$7,994,715	$31,306,351	$10,976,022
Total Community ($)	$31,228,668	$33,778,424	$2,549,756	$37,519,741	$6,291,073	$41,261,062	$10,032,394	$45,002,380	$13,773,712
Employment (FTE)	1,134	1,227	93	1,363	229	1,499	364	1,635	500
Instate Impacts									
Income ($)	$15,056,693	$16,186,375	$1,129,682	$17,845,018	$2,788,325	$19,503,661	$4,446,968	$21,162,305	$6,105,612
Total Community ($)	$29,623,103	$31,533,939	$1,910,836	$34,339,790	$4,716,687	$37,145,645	$7,522,542	$39,951,501	$10,328,398
Employment (FTE)	985	1,049	64	1,142	157	1,236	250	1,329	344
PNW Impacts									
Income ($)	$60,473,957	$65,214,637	$4,740,680	$72,148,787	$11,674,830	$79,082,937	$18,608,980	$86,017,087	$25,543,130
Total Community ($)	$162,817,876	$173,354,747	$10,536,871	$188,776,410	$25,958,534	$204,198,072	$41,380,196	$219,619,735	$56,801,859
Employment (FTE)	6,856	7,299	444	7,949	1,093	8,598	1,742	9,247	2,392
Total U.S. Impacts									
Income ($)	$95,893,051	$103,763,440	$7,870,389	$115,337,541	$19,444,490	$126,911,642	$31,018,591	$138,485,742	$42,592,691
Total Community ($)	$403,124,970	$429,418,953	$26,293,983	$468,086,572	$64,961,602	$506,754,189	$103,629,219	$545,421,805	$142,296,835
Employment (FTE)	15,647	16,667	1,021	18,168	2,521	19,669	4,022	21,170	5,523

2. Dutch Harbor Offshore	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$23,597,565	$22,481,863	($1,115,702)	$20,841,124	($2,756,441)	$19,200,386	($4,397,179)	$17,559,647	($6,037,918)
Total Community ($)	$37,056,716	$35,520,428	($1,536,288)	$33,261,179	($3,795,537)	$31,001,928	($6,054,788)	$28,742,675	($8,314,041)
Employment (FTE)	1,346	1,290	(56)	1,208	(138)	1,126	(220)	1,044	(302)
Instate Impacts									
Income ($)	$28,141,881	$26,789,547	($1,352,334)	$24,800,822	($3,341,059)	$22,812,096	($5,329,785)	$20,823,370	($7,318,511)
Total Community ($)	$69,002,238	$66,381,911	($2,620,327)	$62,528,493	($6,473,745)	$58,675,076	($10,327,162)	$54,821,651	($14,180,587)
Employment (FTE)	2,295	2,208	(87)	2,080	(215)	1,952	(344)	1,824	(472)
PNW Impacts									
Income ($)	$328,772,392	$313,903,374	($14,869,018)	$292,037,173	($36,735,219)	$270,170,972	($58,601,420)	$248,304,769	($80,467,623)
Total Community ($)	$865,415,323	$831,966,755	($33,448,568)	$782,777,689	($82,637,634)	$733,588,624	($131,826,699)	$684,399,555	($181,015,768)
Employment (FTE)	36,439	35,030	(1,408)	32,959	(3,480)	30,888	(5,551)	28,817	(7,622)
Total U.S. Impacts									
Income ($)	$380,511,838	$363,174,784	($17,337,054)	$337,679,119	($42,832,719)	$312,183,454	($68,328,384)	$286,687,786	($93,824,052)
Total Community ($)	$1,574,719,324	$1,515,342,160	($59,377,164)	$1,428,022,810	($146,696,514)	$1,340,703,463	($234,015,861)	$1,253,384,102	($321,335,222)
Employment (FTE)	61,121	58,816	(2,305)	55,427	(5,694)	52,038	(9,083)	48,649	(12,472)

Appendix 3A Summary Economic Impacts by Location and Alternative; NMFS Data Scenario (continued)

3. Akutan/Inshore Floaters	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$5,529,801	$6,169,662	$639,861	$7,110,635	$1,580,834	$8,051,608	$2,521,807	$8,992,581	$3,462,780
Total Community ($)	$7,301,901	$8,077,747	$775,846	$9,218,696	$1,916,795	$10,359,644	$3,057,743	$11,500,593	$4,198,692
Employment (FTE)	316	350	34	399	83	449	132	498	182
Instate Impacts									
Income ($)	$8,558,591	$9,236,421	$677,830	$10,233,231	$1,674,640	$11,230,041	$2,671,450	$12,226,851	$3,668,260
Total Community ($)	$20,762,621	$22,141,881	$1,379,260	$24,170,205	$3,407,584	$26,198,532	$5,435,911	$28,226,859	$7,464,238
Employment (FTE)	691	737	46	804	113	872	181	939	248
PNW Impacts									
Income ($)	$44,122,401	$48,668,307	$4,545,906	$55,353,468	$11,231,067	$62,038,630	$17,916,229	$68,723,792	$24,601,391
Total Community ($)	$114,230,047	$123,807,905	$9,577,858	$137,892,996	$23,662,949	$151,978,095	$37,748,048	$166,066,186	$51,836,139
Employment (FTE)	4,810	5,213	403	5,806	996	6,399	1,589	6,992	2,183
Total U.S. Impacts									
Income ($)	$58,210,792	$64,074,390	$5,863,598	$72,697,335	$14,486,543	$81,320,279	$23,109,487	$89,943,224	$31,732,432
Total Community ($)	$231,051,979	$249,647,646	$18,595,667	$276,994,234	$45,942,255	$304,340,820	$73,288,841	$331,687,407	$100,635,428
Employment (FTE)	8,968	9,690	722	10,751	1,783	11,813	2,845	12,874	3,906

4. Total BS/AI	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$49,457,695	$51,013,954	$1,556,259	$53,295,495	$3,837,800	$55,577,038	$6,119,343	$57,858,579	$8,400,884
Total Community ($)	$75,587,285	$77,376,599	$1,789,314	$79,999,616	$4,412,331	$82,622,634	$7,035,349	$85,245,648	$9,658,363
Employment (FTE)	2,797	2,867	70	2,971	174	3,074	277	3,177	380
Instate Impacts									
Income ($)	$51,757,165	$52,212,343	$455,178	$52,879,071	$1,121,906	$53,545,798	$1,788,633	$54,212,526	$2,455,361
Total Community ($)	$119,387,962	$120,057,731	$669,769	$121,038,488	$1,650,526	$122,019,253	$2,631,291	$123,000,011	$3,612,049
Employment (FTE)	3,972	3,994	22	4,027	55	4,059	88	4,092	120
PNW Impacts									
Income ($)	$433,368,750	$427,786,318	($5,582,432)	$419,539,428	($13,829,322)	$411,292,539	($22,076,211)	$403,045,648	($30,323,102)
Total Community ($)	$1,142,463,246	$1,129,129,407	($13,333,839)	$1,109,447,095	($33,016,151)	$1,089,764,791	($52,698,455)	$1,070,085,476	($72,377,770)
Employment (FTE)	48,104	47,543	(561)	46,714	(1,390)	45,885	(2,219)	45,057	(3,048)
Total U.S. Impacts									
Income ($)	$534,615,681	$531,012,614	($3,603,067)	$525,713,995	($8,901,686)	$520,415,375	($14,200,306)	$515,116,752	($19,498,929)
Total Community ($)	$2,208,896,273	$2,194,408,759	($14,487,514)	$2,173,103,616	($35,792,657)	$2,151,798,472	($57,097,801)	$2,130,493,314	($78,402,959)
Employment (FTE)	85,736	85,173	(562)	84,347	(1,389)	83,520	(2,216)	82,693	(3,043)

Appendix 3B Summary Economic Impacts by Location and Alternative; Industry Data Scenario

1. Dutch Harbor Inshore	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$23,311,640	$25,482,454	$2,170,814	$28,983,765	$5,672,125	$32,485,077	$9,173,437	$35,986,402	$12,674,762
Total Community ($)	$34,637,815	$37,323,787	$2,685,972	$41,655,999	$7,018,184	$45,988,209	$11,350,394	$50,320,443	$15,682,628
Employment (FTE)	1,258	1,356	98	1,513	255	1,671	412	1,828	570
Instate Impacts									
Income ($)	$15,823,066	$16,928,066	$1,105,000	$18,710,325	$2,887,259	$20,492,583	$4,669,517	$22,274,850	$6,451,784
Total Community ($)	$30,747,651	$32,597,147	$1,849,496	$35,580,203	$4,832,552	$38,563,260	$7,815,609	$41,546,326	$10,798,675
Employment (FTE)	1,023	1,084	62	1,184	161	1,283	260	1,382	359
PNW Impacts									
Income ($)	$62,340,613	$66,804,023	$4,463,410	$74,003,072	$11,662,459	$81,202,119	$18,861,506	$88,401,237	$26,060,624
Total Community ($)	$166,312,859	$176,164,650	$9,851,791	$192,054,630	$25,741,771	$207,944,603	$41,631,744	$223,834,722	$57,521,863
Employment (FTE)	7,003	7,418	415	8,087	1,084	8,756	1,753	9,425	2,422
Total U.S. Impacts									
Income ($)	$101,475,320	$109,214,543	$7,739,223	$121,697,161	$20,221,841	$134,179,780	$32,704,460	$146,662,398	$45,187,078
Total Community ($)	$416,933,074	$442,230,902	$25,297,828	$483,033,845	$66,100,771	$523,836,790	$106,903,716	$564,639,731	$147,706,657
Employment (FTE)	16,183	17,165	982	18,748	2,566	20,332	4,149	21,916	5,733

2. Dutch Harbor Offshore	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$24,804,516	$23,731,898	($1,072,618)	$21,967,509	($2,837,007)	$20,271,841	($4,532,675)	$18,541,813	($6,262,703)
Total Community ($)	$38,231,487	$36,775,186	($1,456,301)	$34,378,286	($3,853,201)	$32,077,429	($6,154,058)	$29,728,551	($8,502,936)
Employment (FTE)	1,389	1,336	(53)	1,249	(140)	1,165	(224)	1,080	(309)
Instate Impacts									
Income ($)	$29,099,996	$27,788,502	($1,311,494)	$25,691,616	($3,408,380)	$23,680,294	($5,419,702)	$21,626,191	($7,473,805)
Total Community ($)	$69,985,482	$67,443,581	($2,541,901)	$63,439,207	($6,546,275)	$59,603,212	($10,382,270)	$55,683,026	($14,302,456)
Employment (FTE)	2,328	2,244	(85)	2,110	(218)	1,983	(345)	1,852	(476)
PNW Impacts									
Income ($)	$344,448,622	$330,169,384	($14,279,238)	$306,527,636	($37,920,986)	$284,107,331	($60,341,291)	$261,076,304	($83,372,318)
Total Community ($)	$891,364,590	$859,638,391	($31,726,199)	$807,118,805	($84,245,785)	$757,295,825	($134,068,765)	$706,124,544	($185,240,046)
Employment (FTE)	37,531	36,196	(1,336)	33,984	(3,547)	31,886	(5,645)	29,732	(7,800)
Total U.S. Impacts									
Income ($)	$398,315,184	$381,689,784	($16,625,400)	$354,877,421	($43,437,763)	$328,059,466	($70,255,718)	$301,244,308	($97,070,876)
Total Community ($)	$1,608,654,366	$1,552,859,844	($55,794,522)	$1,462,878,790	($145,775,576)	$1,372,877,555	($235,776,811)	$1,282,886,410	($325,767,956)
Employment (FTE)	62,438	60,272	(2,166)	56,780	(5,658)	53,287	(9,151)	49,794	(12,644)

Appendix 3B Summary Economic Impacts by Location and Alternative; Industry Data Scenario (continued)

3. Akutan/Inshore Floaters	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$6,236,395	$6,894,721	$658,326	$7,956,536	$1,720,141	$9,018,351	$2,781,956	$10,080,167	$3,843,772
Total Community ($)	$8,117,903	$8,911,442	$793,539	$10,191,337	$2,073,434	$11,471,232	$3,353,329	$12,751,129	$4,633,226
Employment (FTE)	352	386	34	441	90	497	145	552	201
Instate Impacts									
Income ($)	$8,338,970	$8,924,790	$585,820	$9,869,661	$1,530,691	$10,814,532	$2,475,562	$11,759,403	$3,420,433
Total Community ($)	$20,175,193	$21,351,034	$1,175,841	$23,247,549	$3,072,356	$25,144,072	$4,968,879	$27,040,588	$6,865,395
Employment (FTE)	671	710	39	773	102	836	165	900	228
PNW Impacts									
Income ($)	$46,965,853	$51,392,112	$4,426,259	$58,526,897	$11,561,044	$65,670,364	$18,704,511	$72,890,626	$25,924,773
Total Community ($)	$119,642,768	$128,901,901	$9,259,133	$143,828,418	$24,185,650	$158,770,076	$39,127,308	$173,785,423	$54,142,655
Employment (FTE)	5,038	5,427	390	6,056	1,018	6,685	1,647	7,317	2,280
Total U.S. Impacts									
Income ($)	$61,541,219	$67,211,623	$5,670,404	$76,474,221	$14,933,002	$85,503,247	$23,962,028	$94,638,506	$33,097,287
Total Community ($)	$238,873,854	$256,541,051	$17,667,197	$285,390,082	$46,516,228	$313,531,999	$74,658,145	$341,998,068	$103,124,214
Employment (FTE)	9,272	9,957	686	11,077	1,805	12,169	2,898	13,274	4,003

4. Total BS/AI	Base	30/70 Alternative		35/65 Alternative		40/60 Alternative		45/55 Alternative	
	Value	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base	Value	Unit Change From Base
Local Impacts									
Income ($)	$54,352,551	$56,109,073	$1,756,522	$58,907,810	$4,555,259	$61,775,269	$7,422,718	$64,608,382	$10,255,831
Total Community ($)	$80,987,205	$83,010,415	$2,023,210	$86,225,622	$5,238,417	$89,536,870	$8,549,665	$92,800,123	$11,812,918
Employment (FTE)	2,999	3,078	79	3,203	205	3,333	334	3,460	461
Instate Impacts									
Income ($)	$53,262,032	$53,641,358	$379,326	$54,271,602	$1,009,570	$54,987,409	$1,725,377	$55,660,444	$2,398,412
Total Community ($)	$120,908,326	$121,391,762	$483,436	$122,266,959	$1,358,633	$123,310,544	$2,402,218	$124,269,940	$3,361,614
Employment (FTE)	4,022	4,038	16	4,067	45	4,102	80	4,134	112
PNW Impacts									
Income ($)	$453,755,088	$448,365,519	($5,389,569)	$439,057,605	($14,697,483)	$430,979,814	($22,775,274)	$422,368,167	($31,386,921)
Total Community ($)	$1,177,320,217	$1,164,704,942	($12,615,275)	$1,143,001,853	($34,318,364)	$1,124,010,504	($53,309,713)	$1,103,744,689	($73,575,528)
Employment (FTE)	49,572	49,041	(531)	48,127	(1,445)	47,327	(2,245)	46,474	(3,098)
Total U.S. Impacts									
Income ($)	$561,331,723	$558,115,950	($3,215,773)	$553,048,803	($8,282,920)	$547,742,493	($13,589,230)	$542,545,212	($18,786,511)
Total Community ($)	$2,264,461,294	$2,251,631,797	($12,829,497)	$2,231,302,717	($33,158,577)	$2,210,246,344	($54,214,950)	$2,189,524,209	($74,937,085)
Employment (FTE)	87,892	87,394	(498)	86,605	(1,287)	85,788	(2,104)	84,984	(2,909)

4.0 CATCHER VESSEL OPERATIONAL AREA

4.1 Catcher Vessel Operational Area Alternatives

The Catcher Vessel Operational Area (CVOA) sometimes referred to as the Inshore Operational Area was approved by the Council and the Secretary of Commerce for the "B" season in 1992. The CVOA will consist of the area North of the Aleutian Islands, south of 56 N. Latitude, between 163 and 168 W. Longitude, an area of approximately 16,365 square miles. It should be noted that part of the Bogoslof area (FMP Zone 518) is included within the CVOA. In 1992 the Bogoslof area was closed to directed pollock harvesting, in effect decreasing the size of the inshore zone by approximately 2,400 square miles. Only vessels which harvest but do not process pollock (catcher vessels) would be allowed to use the CVOA for the directed targeting of pollock. Processing vessels including Motherships and Catcher/-Processors may not operate within the zone. Figure 4.1 shows the catcher vessel operational area.

This analysis will focus on the CVOA as proposed rather than on the CVOA as exists. The analytical team has been asked to examine the CVOA from several perspectives and with several definitional options. Because of the complexity of the inshore-offshore alternatives, examining each CVOA option as it applies to each of the different allocational splits, i.e. 70% offshore / 30% inshore, etc., is not undertaken. Rather, this analysis will examine several issues regarding the CVOA and then summarize from the perspective of three general alternatives: (1) An inshore/offshore allocation of pollock TAC with the CVOA. (2) An inshore/offshore allocation of pollock TAC without the CVOA. (3) The implementation of a CVOA without an allocation. This final alternative, although not specifically requested by the Council, sheds light on the effects of implementing an operational area with an allocation. Additionally there exist some potential sub-options within the CVOA alternative; (1) the treatment of motherships, (2) seasonal adjustments to the CVOA, and (3) the degrees of exclusivity of the CVOA.

4.2 Pros and Cons of the Proposed CVOA

The CVOA was deemed a necessary part of the inshore-offshore amendment for several reasons:

1) The shore based harvesting sector relies almost entirely on the CVOA. In 1989, over 99% of the shore base processed pollock was harvested inside the area [NPFMC, 1992a]. In 1991 the shore base harvester relied less on the inshore zone, but still harvested over 93% from within the zone [ADF&G, 1991][1].

2) Without the CVOA it was argued, the offshore sector would take all the pollock nearshore then move offshore when all the fish nearshore had been taken, leaving the inshore sector without pollock to process.

3) Shore based catcher vessels need to deliver fish to processing facilities shortly after harvesting. If the pollock stocks near the plants had been fished out, then the catcher vessels would have to travel farther away perhaps beyond a range whereby timely deliveries of pollock are possible.

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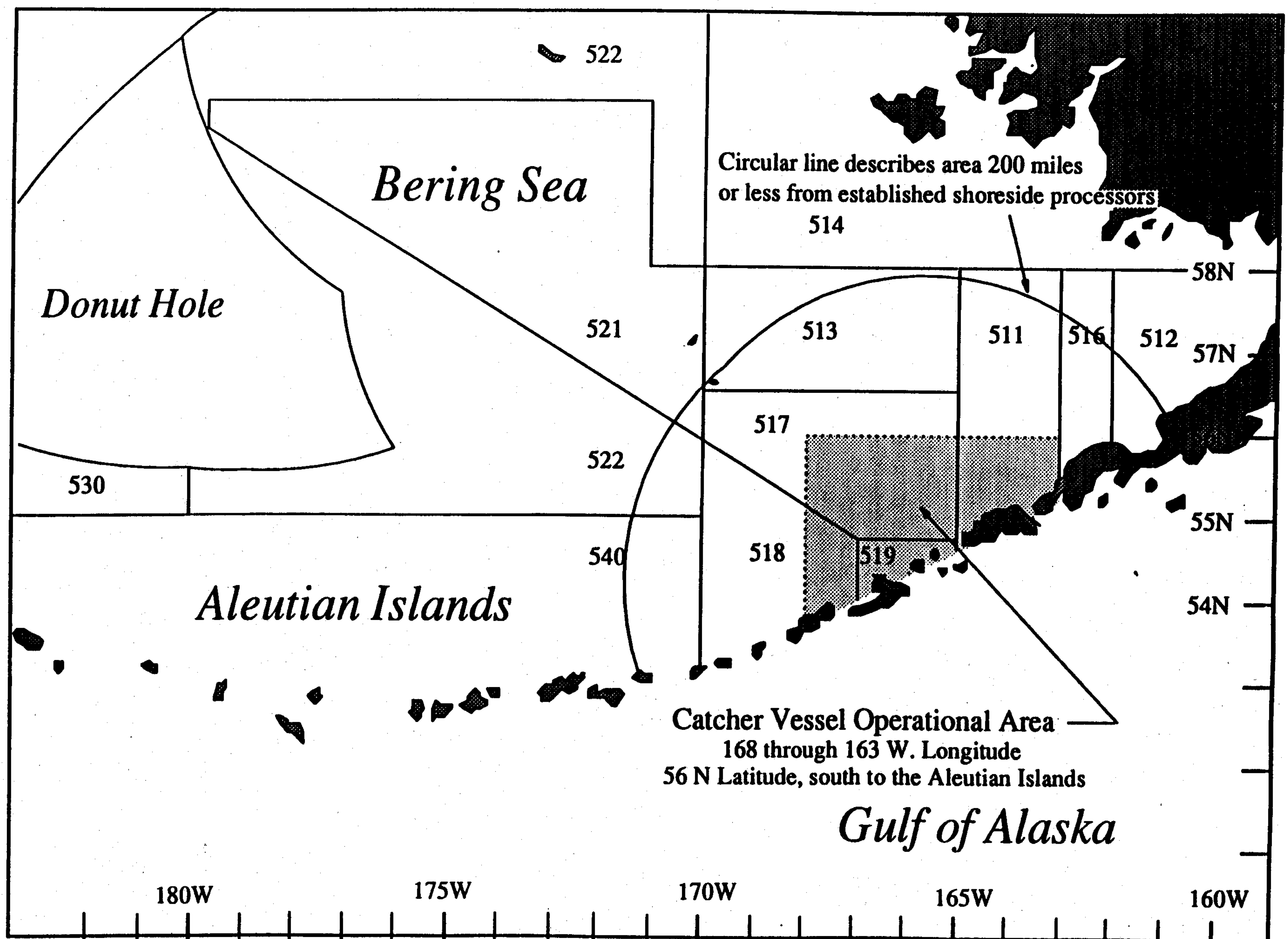
[1]The Fish Ticket Database contains catch information based on 1 longitude by 1/2 latitude blocks, and therefore it is possible to estimate the dependence on the CVOA by the different sectors. Weekly processor reports detail catch by management zones, part of four of which comprise the CVOA. Fish ticket data is deemed by NMFS to be less reliable than the weekly processor reports by which they manage the fishery. In fact the 1991 fish tickets showed the total pollock catch to be 1.03 million MT while the weekly report data estimated total pollock catch to be 1.36 million MT a difference of 25%.

Figure 4.1 Catcher Vessel Operational Area (CVOA)



CV⁻ ⁻ZOOM.DRW

Additionally the cost of making many long runs to and from the shore based plant soon fails to be cost effective.

4) Much of the perceived pre-emption problem arises from the fact that the offshore sector has the mobility to fish wherever they like. Shore based catcher vessels are much more limited. The CVOA, it is argued would eliminate this aspect of the pre-emption problem by creating a zone in which only catcher vessels may operate.

There are also many arguments against the CVOA. These include:

1) The CVOA is an important part of the offshore harvest. In 1989 it was estimated that 55% of the offshore sector's total pollock harvest came from within the zone. In 1991, fish ticket data showed only 26% of the offshore sector harvest came from within the zone (again the shortcomings of the fish ticket data should be noted).

2) It is argued that if forced out of the zone for the entire year the offshore sector could face greater bycatch problems. The bycatch of prohibited species could mean shorter seasons and more political turmoil.

3) It is thought that the size of pollock outside the zone is less than the size of the pollock inside the zone. If pollock are too small (< 25cm) they become impossible to process with Baader 182 filleting machines [Chitwood, 1992]. Even if they are large enough to process, the machines are limited to a given number of fish per hour, and therefore small fish are more costly to process [Wood, 1992]. Additional it is claimed that pollock are less uniform in size outside the zone than inside the zone. With more variance in size, the filleting machines need to be adjusted more of ten, or set such that product recovery rates suffer. Either way the cost of production increases.

4) It is said that the catch per unit effort (CPUE) is less outside the CVOA than inside the CVOA. Smaller CPUEs mean a more costly operation.

5) If as expected the offshore sector will go north and west, toward the Pribilof Islands, if the CVOA is implemented, it is argued that there will be more gear conflicts between crabbers and trawlers. The area around the Pribilofs, while hosting large quantities of pollock, is used extensively for crabbing in the fall and winter months.

6) As in #5 above a shift Northward and Westward pushes vessels into waters more susceptible to rough seas and ice. It is argued that even were pollock stocks available they could be inaccessible in the first quarter because of the ice edge. Further, harvest vessels delivering to motherships face increased costs to run to port for provisions.

4.3 The Analysis

The analysis of the Catcher Vessel Operational Area examines the characteristics of the fish populations, fishing practices, and other factors prevalent in the BSAI both inside and outside the CVOA. Eight issues which shed light on the practices of the industry and ramifications of the CVOA are examined:

1) Historical and projected pollock removals from the CVOA.
2) Pollock length frequency data.
3) Catch per unit effort.
4) Bycatch of prohibited species.

5) Sector dependence on the CVOA.
6) Catcher Vessel and Processing Constraints.
7) Ice and weather conditions.
8) Gear Conflicts.
9) Marine Mammals and Seabirds.

4.3.1 Historical and Projected Removals of Pollock in the CVOA: Will removals of Pollock in the CVOA change if one of the inshore-offshore allocations is adopted?

Estimated pollock removals from the CVOA are shown in Table 4.1 for the years 1980 through 1991. For much of that time foreign vessels were not allowed to fish in the proposed CVOA in the first half of the year because of the Bristol Bay Pot Sanctuary and the Winter Halibut Savings Area. Foreign pollock catches after 1985 and JV harvests prior to 1984 were not available. Foreign and JV data are from Tables 2.2 and 2.4 of the original SEIS [NPFMC, 1992a]. Inshore and offshore data are from fish tickets. It should be noted that fish ticket data are generally regarded as a partial data set, especially with regards to the offshore sector. The overall average level of removals from the CVOA between 1980 and 1991 was 445,123 mt. Since 1986 (the end of data from foreign fishing) the average has been 682,123 mt, and since 1989 (the end of significant JV fishing) the average has been 510,922 mt.

Table 4.1 Pollock Removals From The CVOA (mt)

Year	Foreign	J.V.	Inshore	Offshore	Total
80	220,362	(NA)	(NA)	(NA)	220,362
81	350,937	(NA)	(NA)	(NA)	350,937
82	232,421	(NA)	(NA)	(NA)	232,421
83	201,906	(NA)	(NA)	(NA)	201,906
84	122,368	153,679	(NA)	(NA)	276,047
85	119,073	273,668	(NA)	(NA)	392,741
86	(NA)	647,554	15,061	20,148	682,763
87	(NA)	457,966	93,729	67,430	619,125
88	(NA)	394,419	185,491	252,502	832,412
89		132,058	217,629	388,756	738,443
90			256,390	91,030	347,420
91			252,203	194,701	446,904

Under the proposed allocations, from 30% up to 45% of the total BSAI TAC would go to the inshore sector. The Council's recommendation to the Secretary of Commerce in 1991 included a provision that 65% of the offshore sector harvest during the "A" season could also come from within the CVOA. If motherships are allowed to operate within the CVOA additional harvests could also occur. Table 4.2

shows the projected pollock removals from the under different percentage allocations. The table assumes: (1) the BSAI TAC will be 1,352,600 mt, 85,000 mt of which is allocated to the Aleutian Islands subarea. (2) 34% of BSAI TAC is allocated to 'A' season. (3) 100% of the inshore harvest is from the CVOA, and (4) CVOA removals by offshore mothership operations are proportional to levels in 1991.

Table 4.2 Potential Removals From CVOA

Allocation %	Inshore	'A' Season Offshore	Motherships (if allowed)	Potential Removals
30%	380,280	196,098	34,950	611,328
35%	443,660	182,091	32,453	658,204
40%	507,040	168,084	29,957	705,081
45%	570,420	154,077	27,461	751,957

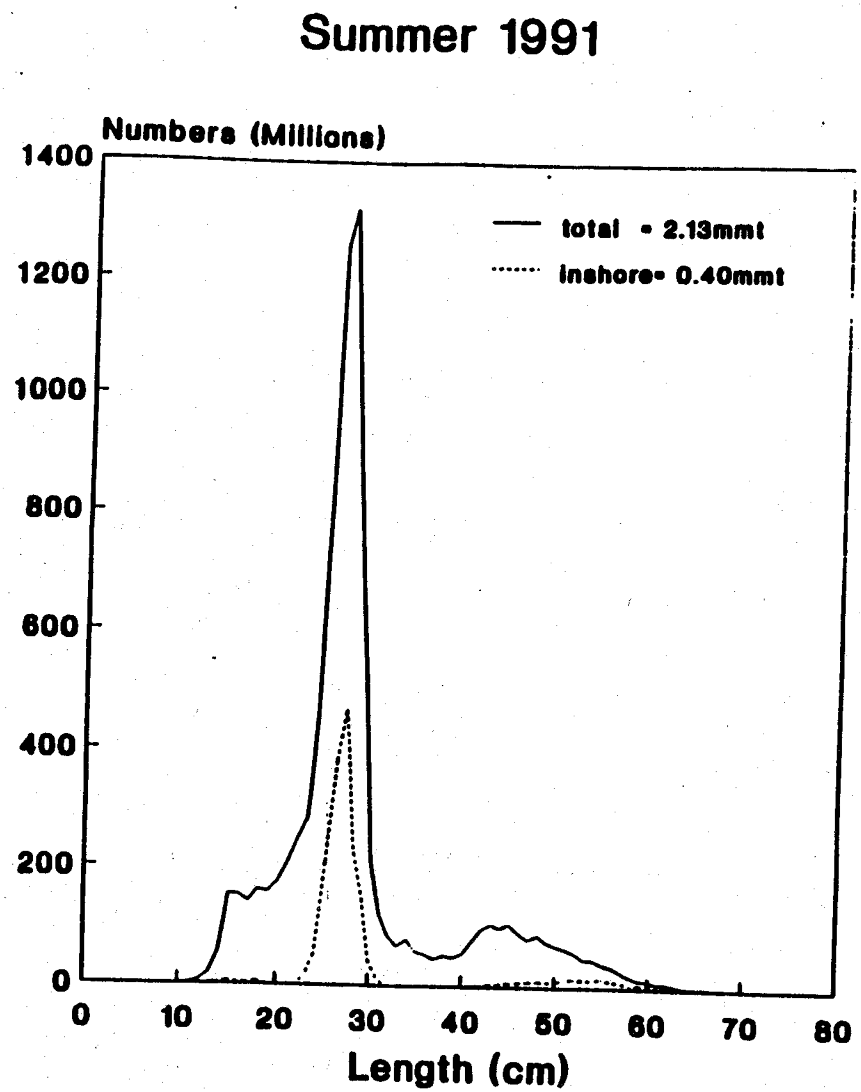
Table 4.2 shows that potential removals from the CVOA could exceed 50% of the total BSAI TAC given limited access to the offshore sector, at inshore allocations over 35%. Even if no offshore or mothership processing were allowed inside the CVOA, potential removals could increase with respect to 1991 under the larger inshore allocations. Table 4.1 shows that these levels of removals have occurred in the past, but historically, smaller levels of removals have been the norm.

4.3.2 **Length Frequency Data:** Is there information to support the claim that pollock are smaller outside the CVOA than inside?

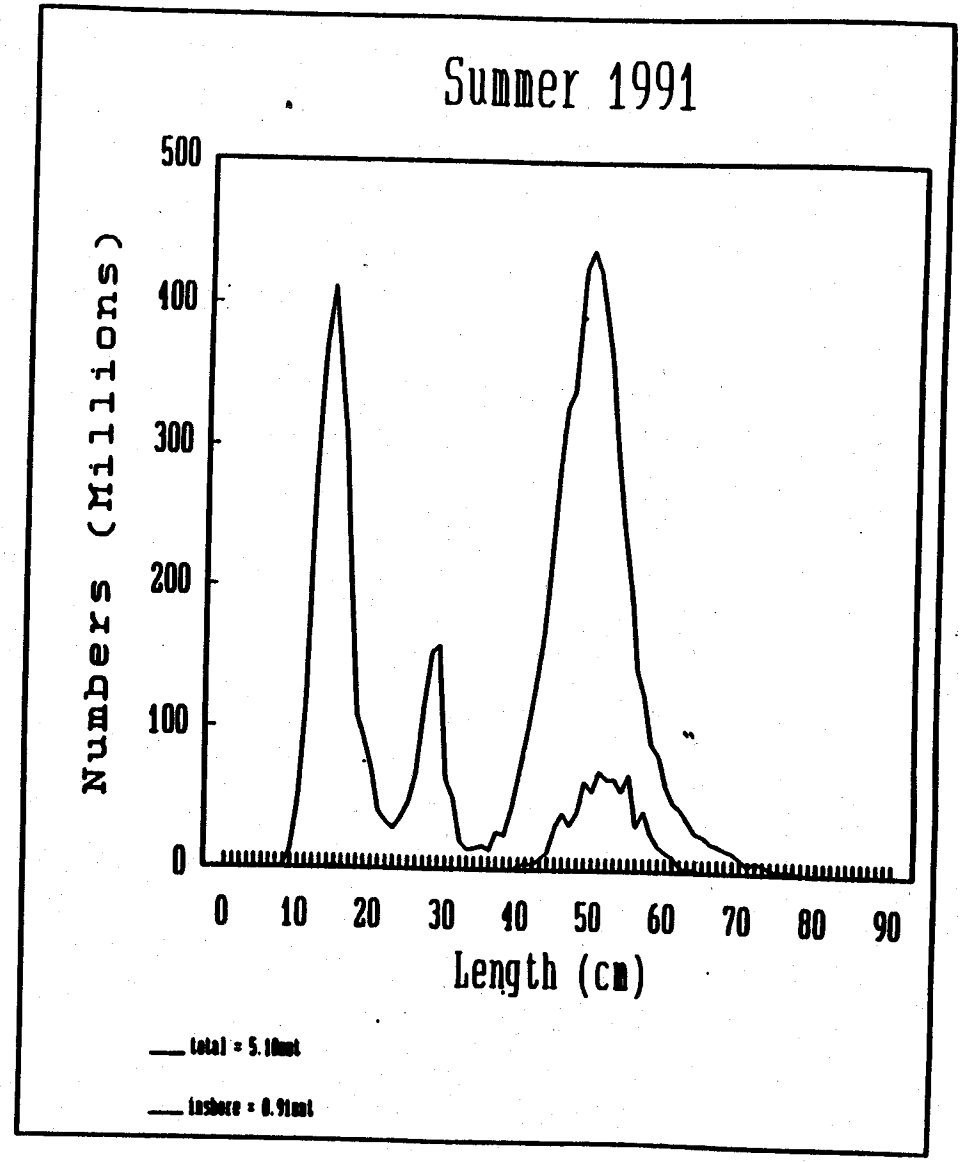
Figure 4.2 summarizes length frequency data from the 1991 summer bottom and pelagic trawl surveys. Although Williamson and Walters do not discuss the issue, it appears that at least in the bottom trawl survey, many more small fish were evident outside the CVOA than inside. What is not clear is whether these smaller fish have recruited into the fishery. Size information regarding pollock which have recruited into the fishery inside and outside the CVOA was provided by the observer data base. Observed length frequency data from the joint venture fisheries from 1987-1989 and the domestic fishery from 1990 and 1991 are summarized in Figure 4.3.

From Figure 4.3 it is not possible to conclude that the mean length of pollock in the fishery within the CVOA and outside the CVOA are different. It does appear however that the variance in the size inside the zone could be slightly smaller than outside. More variance in the size of pollock leads to higher cost in processing [Wood, 1992, Riley, 1992]. To gain more conclusive evidence a more in-depth analysis of length data was undertaken. Table 4.3 shows means and variances in the inshore and offshore areas for each year. Because of the large number of observations all differences between means and variance within a given year are significant. It is apparent that the mean length of observed pollock is greater in the CVOA than outside the CVOA. Additionally it appears that the variance of lengths is less inside the CVOA than outside the CVOA.

Figure 4.2



Summer 1991 biomass and size composition of pelagic (surface to 0.5 m off bottom) pollock for the inshore zone and the total EBS shelf/slope.



Summer 1991 biomass and size composition of demersal pollock for the inshore zone and the total EBS shelf/slope.

Source: Williamson, 1992

Figure 4.3

Observer Length Frequency Data

Inside and Outside CVOA

Joint Venture 87-89, Domestic 1990-1991

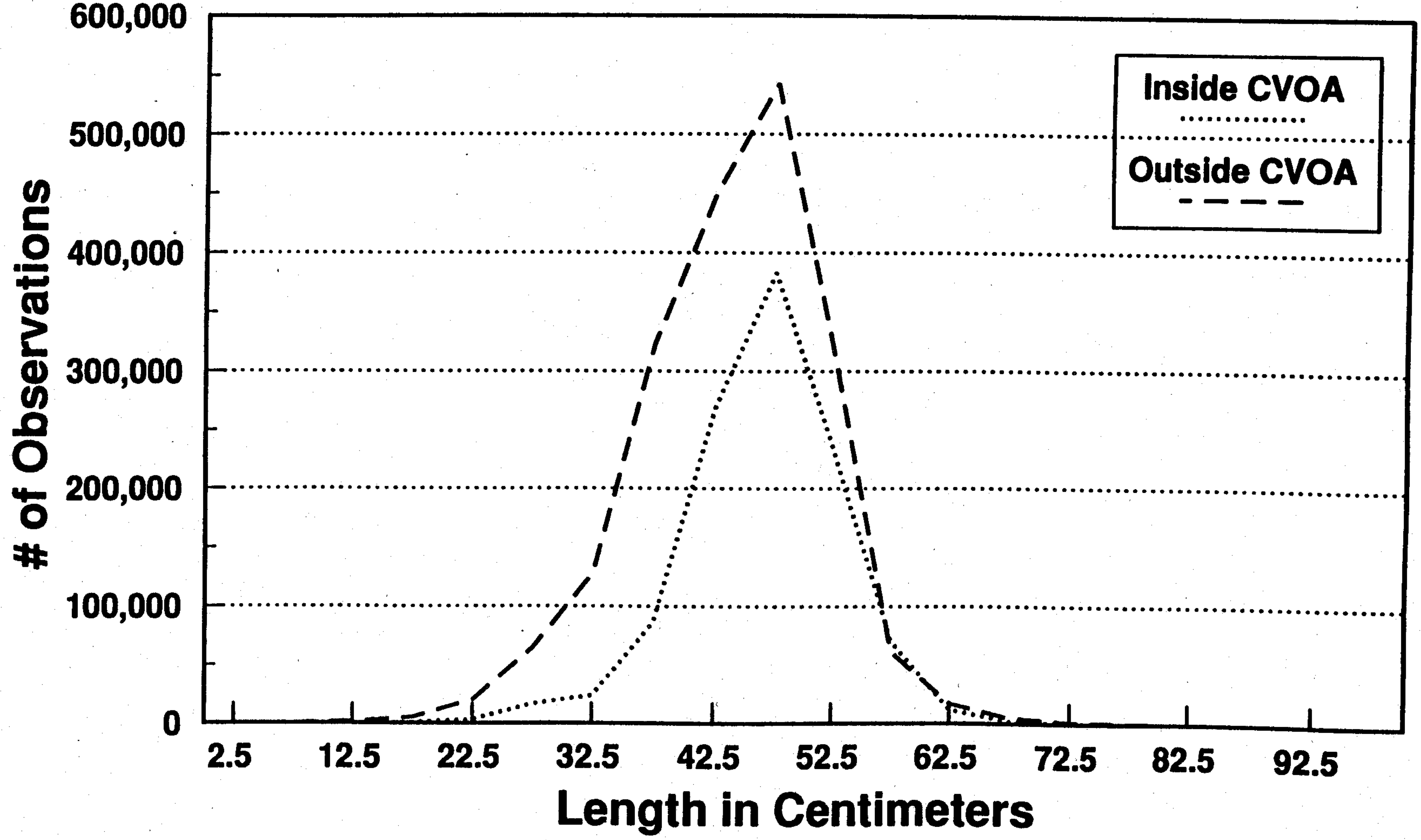


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Table 4.3 Observed Means and Variance In and Out of CVOA Joint Venture 1987-1989 and Domestic 1990-1991.

Year	CVOA	Observations	Mean	Variance
87	All	672,790	42.83	51.77
87	Inside	209,272	45.59	38.01
87	Outside	463,518	41.59	53.01
88	All	427,872	41.93	35.05
88	Inside	226,610	42.95	26.05
88	Outside	201,262	40.78	42.04
89	All	249,466	44.96	35.57
89	Inside	133,996	46.18	17.55
89	Outside	115,470	43.55	52.75
90	All	851,787	44.88	49.26
90	Inside	214,569	47.96	32.15
90	Outside	637,218	43.85	50.77
91	All	832,109	46.50	61.41
91	Inside	315,422	47.64	54.59
91	Outside	516,687	45.81	64.31

Note: All variances and all means within years are significantly different.

Though it seems lengths data would indicate that it would be more profitable to process fish within the CVOA (to the extent that profit correlates with the mean length and variance), it is also apparent that the means and variance of length data vary significantly between years. A more in depth look at length data examined the differences between quarters within a given year. A simple test of means over all observations over all years showed that because of the large number of observations in each year/sector/quarter cell any differences in variance between cell can be assumed to be significantly different even at the 0.9995/0.0005 level using a standard F test. Pair-wise comparison of means within years were undertaken for 1990 and 1991 using t tests and least squares means. Because there were multiple comparisons, t test results were judged at 0.0001 probability levels. All means within a given year for 1990 and 1991 were significantly different from each other at this level. The means and variance of lengths by year/CVOA/quarter are shown in Table 4.4.

Table 4.4 Observed Means and Variance of Length Frequency Data Joint Venture 1987-1989 and Domestic 1990-1991.

Year	CVOA	Quarter	Observations	Mean	Variance
87	Inside	1	158,836	45.5756	32.5783
87	Inside	2	38,221	45.0564	62.1286
87	Inside	3	12,215	47.3791	20.0856
87	Outside	1	163,908	43.4415	52.1725
87	Outside	2	262,667	39.7948	48.4915
87	Outside	3	29,985	46.2132	30.5347
87	Outside	4	6,958	45.6819	28.5849
88	Inside	1	107,345	42.0908	36.1433
88	Inside	2	39,686	43.1589	15.9372
88	Inside	3	58,679	43.1589	15.9372
88	Inside	4	20,900	43.5491	15.2016
88	Outside	1	18,081	44.13	38.1184
88	Outside	2	166,787	39.9816	40.7052
88	Outside	3	12,469	45.3372	21.6399
88	Outside	4	3,925	44.7518	21.0597
89	Inside	1	41,144	44.883	20.2342
89	Inside	3	25,241	46.5047	16.1818
89	Inside	4	67,611	46.8496	14.9242
89	Outside	1	6,958	50.93	58.611
89	Outside	3	62,539	44.1568	38.0532
89	Outside	4	45,973	41.5982	59.2979
90	Inside	1	62,193	45.8678	26.8917
90	Inside	2	56,090	47.1763	33.1949
90	Inside	3	82,650	49.6594	28.9551
90	Inside	4	13,636	50.3483	25,4376
90	Outside	1	168,548	48.1317	24.1633
90	Outside	2	195,705	44.2642	43.2829
90	Outside	3	236,374	40.9296	53.6068
90	Outside	4	36,591	40.7076	44.6505
91	Inside	1	131,333	46.975	29.2206
91	Inside	2	71,343	47.1344	76.7842
91	Inside	3	112,746	48.7274	68.2299
91	Outside	1	145,194	49.774	16.3781
91	Outside	2	118,520	43.1071	85.7473
91	Outside	3	252,973	44.7918	68.2921

Note: Because of the large number of observations, variances can be assumed to be significantly different. Pair-wise comparisons of means within a given year were made using least squares means. In 1990 and 1991 all means were significantly difference at the 0.0001 level. Mean comparisons for the years 1987-1987 were not taken.

An examination of Table 4.4 indicated that there were significant differences between quarters. A regression analysis of mean length was undertaken to determine if fishing year and quarter, and CVOA could account for the variance. The results, shown in Table 4.5, indicate that while the date and CVOA are somewhat significant predictors of the mean length of recruited pollock, they do capture a great deal of the variance in length. The date and CVOA variable modeled only account for 19% of the variation in mean length.

Table 4.5

Regression Analysis of Mean Lengths

Model: Mean Length = $\alpha + \beta_1(\text{Date}) + \beta_2(\text{CVOA})$

Regression Results

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	2	54.96925	27.48463	3.930	0.0298
Error	32	223.79469	6.99358		
C Total	34	278.76394			

Root MSE	2.64454	R-square	0.1972
Dep Mean	45.23678	Adj R-sq	0.1470
C.V.	5.84599		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEPT	1	-8.092510	28.48802297	-0.284	0.7782
DATE	1	0.586411	0.31867080	1.840	0.0750
CVOA	1	1.839978	0.89482420	2.056	0.0480

Note: Date is in the form year+quarter, eg, the 1st quarter in 1989 = 89.125, the 2nd quarter = 89.375.

In sum, the data seem to indicate that recruited observed pollock lengths inside the CVOA are greater than outside the CVOA, but perhaps as significant, length both in and outside the zone vary over the years and in fact vary within any given year. Clearly other variable beside the CVOA determine mean length. Perhaps a more important issue for the industry is whether the difference in length affects the profitability of processing those pollock. Industry sources say the minimum acceptable length of pollock for processing is at least 30cm (12"). The length information above indicates that neither inside the CVOA or outside the CVOA will the mean length approach 30cm. In fact in all quarters in all years, the 30cm is more than a standard deviation from the mean. The inference here being that in all years, all quarters, both inside and outside the zone it is unlikely that the of pollock 30cm or less will approach 25% of the catch.

Preliminary information from the 1992 "B" Season contradict the findings above. According to sources in the industry, small pollock are being encountered throughout the Bering Sea/Aleutian Islands. Clearly, the pollock fishery is dynamic and predictions based on past performance should be used with caution.

4.3.3 Catch Per Unit Effort: Are there significant differences in Catch Per Unit Effort (CPUE) inside the CVOA and outside the CVOA

CPUEs have obvious effects of the profitability of fishing operations; higher CPUEs leading to higher profits. The CVOA encompasses areas which many regard to have some of the higher CPUEs in the

BSAI Management Area. Two separate analyses using different datasets and approaches were undertaken to examine CPUEs inside and outside the CVOA. Dr. Jim Norris of Marine Resources Consultants was contracted to analyze CPUEs inside the CVOA and outside the CVOA using fleet-wide data over the years 1981-1990. His analysis is followed by a study by Russ Nelson and Jerry Berger of NMFS/AFSC Observer Program of the CPUEs of individual observed vessels which during any given quarter in either 1990 or 1991 which targeted on pollock both inside and outside the CVOA.

4.3.3.1 Norris Analysis of Fleet-wide CPUEs Inside and Outside the CVOA

4.3.3.1.1 Introduction

In March 1992 the Secretary of Commerce approved the North Pacific Fishery Management Council's inshore/offshore split of Pacific cod (*Gadus macrocephalus*) and walleye pollock (*Theragra chalcogramma*) in the Gulf of Alaska. However, only the 1992 allocation plan was approved for the Bering Sea, and further analysis was requested before making decisions on Bering Sea allocations past 1992.

In addition to proposing a direct allocation of stocks between fleets, a CVOA has been proposed to prohibit offshore vessels from harvesting in nearshore water. Since the proposed CVOA cuts across current management areas, no catch per unit effort (CPUE) data were available on which to evaluate the potential impacts of the proposed CVOA. However, catch and effort data summarized by month, year, target fishery, and one-half-by-one-degree latitude/longitude blocks were available from a database previously compiled by Marine Resources Consultants.

The purpose of this report is to provide summary CPUE statistics for fleets fishing inside and outside the proposed CVOA. Data are summarized by year, quarter, area (inside or outside the CVOA), and target fishery (bottom or midwater). Weighted regression analyses were conducted to test for significant CPUE differences between areas.

4.3.3.1.2 Methods

Data Extraction. The data used in this analysis were extracted from a previously compiled database used to produce a series of reports summarizing CPUEs and bycatch rates of prohibited species in trawl fisheries in the Bering Sea/Aleutian Island (BSAI) management areas [Norris et al. 1991 a-f; Norris et al. 1992]. Data from management areas 512, 514, 516, and 518 were excluded from this analysis because those areas accounted for a very small percentage of the observed pollock catch during the period 1981-1990 or will be closed to pollock fishing in coming years.

All data in the previously compiled database were initially extracted by NMFS staff from the Observer Program North Pacific [NORPAC] database. NORPAC data are formatted on a tow-by-tow basis. Date and location data were used to categorize each tow into a Month/Block/Year record. Blocks were coded with a six digit number in which the first and last three digits identify the longitude and latitude of the southeast corner of the block, respectively.

Each tow was further categorized into a directed fishery using the following criteria:

Directed Fishery Name		Criteria (% of total catch)
1.	Pollock (Midwater)	Walleye Pollock > 95%
2.	Other Flatfish	Other Flatfish (including rock sole) > 35%
3.	Pacific Cod	Pacific Cod > 45%

4.	Pollock (Bottom)	Walleye Pollock > 50%
5.	Yellowfin Sole	Yellowfin Sole > 20%
6.	Miscellaneous Species	None of the above.

Target fisheries were prioritized as above and were mutually exclusive. That is, tows that satisfied more than one criteria (e.g., Other Flatfish > 35% and Pacific Cod > 45%) were placed in the directed fishery with greatest priority (Other Flatfish in this example).

NMFS staff prepared two summary databases—one in 1991 and another in 1992—by summing catches, minutes towed, and number of tows over each Month/Block/Year/Target record. The 1992 database updated the 1991 database by including data from the 1990 fisheries and bycatch data for salmon and individual crab species (i.e., red king crab and Bairdi Tanner crab), which were previously unavailable.

Data Validation. Six data fields (total catch, number of tows, and bycatches of halibut, herring, king crab, and tanner crab) from the 1992 summary database were cross-checked with the corresponding data fields from the 1991 summary database to validate the data. Two significant discrepancies were found.

First, the 1992 summary database contained 916 Month/Block/Year records from the joint venture fisheries in 1985 and 1986 that were not present in the 1991 summary database. The cause of this discrepancy could not be determined and, therefore, the 916 new records were eliminated. This finding does not invalidate the previous reports. Instead, it simply implies that the sample sizes used to estimate CPUEs and bycatch rates for 1985 and 1986 could have been larger.

Second, 855 Month/Block/Year records (7.4%) from the 1991 summary database had values that were more than five percent different from the corresponding values in the 1992 database. Over half (447) of these records were from the foreign fisheries in 1984, and the most common difference was a large increase in the halibut bycatch. The cause of these differences could not be determined, and, therefore, these 855 records also were eliminated.

Data Analysis. The general null hypothesis to be tested was the following: CPUE by a fleet of vessels fishing inside the CVOA equals the CPUE by a fleet of vessels fishing outside the CVOA. Other factors besides area that may affect CPUEs are season (e.g., fish may be more catchable due to schooling during part of the year) and year (e.g., abundance changes from year to year; improved technology increases fishing power each year). The analysis approach was to use a general linear model to test the effects of two factors—area and season. Factors were tested within years to remove possible year affects. Two levels of the area factor were considered (inside the CVOA and outside the CVOA). Four levels of the season effect were defined by quarters of the calendar year (e.g., Q1 = Jan-Mar). One to four levels of the season factor were considered, depending on the number of quarters for which adequate data (three or more observations) were available within a given year.

An individual sample unit was considered to be a fleet of trawl vessels targeting on walleye pollock using midwater or bottom trawl gear fishing within a given month in a given year in a given one-half-by-one-degree latitude/longitude block. Thus, each record in the summary database contained measurements from one sample unit. It should be noted that the statistical analysis assumes that the sampling units are standardized. That is, the analysis assumes that the fishing power of an average vessel in the fleet is equal for all sample units. Note that it is not necessary that all vessels within each sample unit fleet have the same fishing power, as long as the effort distribution among vessels with different fishing powers is constant for all sample units. More simply stated, the analysis assumes that within each sample unit, the allocation of effort between vessels with high power (e.g., factory trawlers) and vessels with lower power (e.g., catcher boats) is constant. This assumption would be violated if different types of fleets were fishing in different sample units (e.g., all factory trawlers fishing in one unit with smaller catcher vessels fishing in another).

The following data were available from each sample unit: total catch (mt), pollock catch (mt), total hours towed, and total number of tows. The catch of pollock was not available for 1990. CPUEs were measured in metric tons per hour of towing. Since, by definition, total catch in the midwater fishery was at least 95% pollock, only total CPUE was tested in that fishery. For the bottom trawl fishery, both total and pollock CPUEs were tested.

To reduce the potential for violations of the assumption of standardized sample units, all observations (i.e., sample units) based on fewer than three tows were eliminated. This reduced the bottom trawl data set by 48% and the midwater data set by 32%. The rationale for eliminating these observations was that increased tows per sample unit would increase the likelihood that the sample unit contained a mixture of vessel classes.

The mathematical formulations followed those used by Quinn et al. (1982). Let

r = *region;*
f = *season;*
v = *the sampling unit (fleet of fishing vessels fishing in a Month/Block/Year;*
V = *number of sampling units in a sample;*
C_{vrf} = *observed catch in sample unit v;*
E_{vrf} = *observed hours of trawling in sample unit v;*
$U_{vrf} = \frac{C_{vrf}}{E_{vrf}}$ = *observed CPUE in sample unit v;*

Mean CPUEs within each treatment cell were determined by the ratio estimator:

$$\hat{U}_{rf}=\frac{\sum_{v=1}^{V} C_{vrf}}{\sum_{v=1}^{V} E_{vrf}}.$$

The variance was estimated by:

$$v\hat{a}r(\hat{U}_{rf})=\frac{V}{V-1}\frac{\sum_{v=1}^{V}(C_{vrf}-\hat{U}_{rf}E_{vrf})^2}{(\sum_{v=1}^{V}E_{vrf})^2}$$

The regression analyses followed methods described by Kimura (1981). Weighted regressions were performed on the following models:

$$\log(\hat{U}_{wf}) = +R_{wf} + \sum_{f=1}^{n-1} Q_{wf} + \sum_{F=1}^{n-1} R_{wf} Q_{wf}$$

Where weights $= \sqrt{1/v\hat{a}r(\hat{U}_{rf})}$

R_{wf} *is a dummy variable* (1 = *inside CVOA*, 0 = *outside*)

Q_{wf} *is a dummy variable* (1 = *quarter*$_n$, 0 = *outside*)

n = *number of quarters considered*

4.3.3.1.3 Results

Tables 1, 3, and 5 in Appendix 4A summarize total CPUE statistics for each quarter within each year for the domestic, joint venture, and foreign fisheries, respectively. Shaded quarters contain at least one cell with fewer than three observations and were not used in the regression analyses. Tables 2, 4, and 6 in Appendix 4A summarize the results of the regression analyses. Tables 7-12 in Appendix 4A provide the corresponding information for pollock CPUE in the bottom trawl fishery.

The results of the tests are somewhat mixed. For total CPUEs, both the bottom and midwater domestic fisheries in 1990 appear to have enjoyed a significantly higher CPUE outside the CVOA. The differences were not so great in 1989, however. On the other hand, the JV bottom trawl fishery in 1986 had significantly higher CPUE inside the CVOA. Most of the foreign fisheries in the early 80s also seem to have higher CPUEs inside the CVOA. In the bottom trawl fisheries the results for pollock CPUEs were similar to those for total CPUEs.

4.3.3.1.4 Discussion

Due to the lack of standardized sampling units, the results of all tests reported in this document should be used with caution. For example, the finding that the 1990 domestic fisheries had higher CPUEs outside the CVOA may be the result of comparing apples (larger vessels with greater range and fishing power operating outside the CVOA) and oranges (smaller vessels with lower range and fishing power operating inside the proposed CVOA). Without standardized sampling units, it is difficult to draw any meaningful conclusions from this analysis. Nevertheless, when combined with auxiliary information regarding fleet composition within treatment cells, the results may provide some insight into the potential impacts implementing the CVOA may have on CPUEs.

4.3.3.2 Nelson/Berger Analysis of CPUEs of Individual Vessels Inside and Outside the CVOA.

The issue of differing catch rates for pollock and associated bycatches of halibut, herring and salmon inside and outside the Catcher Vessel Operational Area (CVOA) has been raised as part of the analysis of options considered under the Inshore/Offshore amendment for the Bering Sea/Aleutian Islands area. Observer data from 1990 and 1991 were reviewed to determine if differences occurred in 1990 and 1991.

Data from catcher/processors and motherships which fished in both the CVOA and outside the CVOA in the same quarter were used. In each case, the vessels had at least 30 hauls sampled in each of the areas. There were nine cases which met these requirements in 1990 and thirteen in 1991. There were additional instances in both years where vessels fished in both areas but the number of hauls taken in one of the two areas or both areas was too small to make a valid comparison. The average catch rate for pollock (kg/min.

trawled) and bycatch rates (percent of total catch by weight) of halibut, herring, and salmon were estimated for each vessel by area and quarter.

The estimates for 1990 are shown in Table 4.6. Data from nine catcher/processors were compared by quarter. There were three comparisons in each of the first three quarters of the year. There were no comparisons available for the fourth quarter since the pollock fishery was closed. The data show that in 5 of the 6 comparisons during the first and third quarters, the average CPUE estimates for pollock were higher in the areas outside the CVOA than inside. In the second quarter, the average CPUE estimates for pollock were higher in the CVOA than outside. The bycatch rate estimates for herring and salmon were generally higher in the CVOA while there was no clear result for the bycatch of halibut.

Table 4.7 lists the 13 comparisons of data from 1991 where catcher/processors or motherships fished in both areas during a quarter. There were no data from the fourth quarter since the pollock fishery was closed. The majority of data came from observations made during the first quarter of 1991 (8 of 13). The average CPUE estimates for pollock inside the CVOA were greater than outside the area in only one of the thirteen cases. Halibut bycatch rate estimates were higher inside the CVOA in the first quarter but there were mixed results during the second and third quarters. Herring and salmon bycatch rate estimates were higher in the CVOA than outside the area in all cases where catches of herring and salmon were observed.

In general, the comparisons of catch rates in the CVOA and outside the area in 1990 and 1991 indicate that, except for the second quarter of 1990, the average CPUE of pollock was greater outside the CVOA and that the bycatch rates of herring and salmon were higher in the CVOA than outside the area. The data on halibut bycatch rates are mixed, indicating that in some cases the halibut bycatch rate was higher inside the area while at other times it was not.

Table 4.6 Individual vessel comparisons of pollock CPUE and bycatch of halibut, herring, and salmon by catcher/processors inside the catcher vessel operational area and outside the area, 1990

QUARTER	COMPARISON	IN/OUT	POLLOCK (KG/MIN)	HALIBUT (%)	HERRING (%)	SALMON (%)
FIRST	1	Inside	551	0.01	0.0	0.02
		Outside	1,011	0.02	0.0	0.0
	2	Inside	314	0.02	0.0	0.01
		Outside	1,000	0.0	0.0	0.0
	3	Inside	3,113	0.02	0.0	0.0
		Outside	1,931	0.0	0.0	0.0
SECOND	4	Inside	231	0.52	0.0	0.0
		Outside	120	0.05	0.0	0.0
	5	Inside	328	0.29	0.0	0.0
		Outside	100	1.24	0.01	0.0
	6	Inside	437	0.33	0.0	0.0
		Outside	193	0.15	0.0	0.0
THIRD	7	Inside	160	0.0	0.01	0.01
		Outside	170	0.10	0.01	0.0
	8	Inside	44	0.09	6.54	0.02
		Outside	105	0.36	0.01	0.0
	9	Inside	342	0.0	2.21	0.0
		Outside	438	0.05	0.18	0.0

Table 4.7 Individual vessel comparisons of pollock CPUE and bycatch of halibut, herring, and salmon by catcher/processors and motherships inside the catcher vessel operational area and outside the area, 1991

QUARTER	COMPARISON	IN/OUT	POLLOCK (KG/MIN)	HALIBUT (%)	HERRING (%)	SALMON (%)
FIRST	1	Inside	956	0.0	0.0	0.0
		Outside	1,229	0.0	0.0	0.0
	2	Inside	860	0.34	0.0	0.0
		Outside	581	0.0	0.0	0.0
	3	Inside	203	0.62	0.0	0.0
		Outside	710	0.24	0.0	0.0
	4	Inside	327	0.3	0.0	0.01
		Outside	363	0.0	0.0	0.0
	5*	Inside	176	0.0	0.0	0.07
		Outside	857	0.0	0.0	0.0
	6	Inside	247	0.29	0.0	0.01
		Outside	699	0.04	0.0	0.0
	7	Inside	561	0.0	0.0	0.05
		Outside	713	0.0	0.0	0.0
	8*	Inside	321	0.0	0.0	0.01
		Outside	517	0.0	0.0	0.0
SECOND	9	Inside	71	0.04	0.0	0.01
		Outside	75	0.56	0.0	0.0
THIRD	10	Inside	72	0.38	0.0	0.30
		Outside	121	0.22	0.0	0.01
	11	Inside	74	0.35	0.0	0.06
		Outside	87	0.16	0.0	0.0
	12	Inside	118	0.01	0.08	0.03
		Outside	171	0.10	0.01	0.0
	13	Inside	77	0.13	0.05	0.18
		Outside	105	0.36	0.01	0.0

* Indicates data are from mothership observations. All other observations are from catcher/processors.

4.3.4 **Bycatch of Prohibited Species:** Are there differences in the bycatch of prohibited species inside and outside the CVOA?

4.3.4.1 Hypotheses

Differences in bycatch of prohibited species inside and outside of the CVOA could lead to early closures for one sector or the other, and in fact could lead to the closure of one sector due to the bycatch of the other. There are several *a priori* hypothesis which could be expected, based on the location of the CVOA in relation to the remainder of the Bering Sea and Aleutian Islands management area, and on stock densities of the prohibited species. These *a priori* hypotheses and the reasoning behind them follow:

1) Hypothesis: Chinook Salmon and Other Salmon bycatch will be greater inside than outside the CVOA.

   Reasoning: Juvenile salmon are spread throughout the BSAI. Mature salmon however, returning to spawning grounds are funnelled either into Bristol Bay or through the major migration routes through the Aleutian Islands. This more than likely leads them through the CVOA, resulting in higher bycatch rates in the CVOA than in the remainder of the BSAI.

2) Hypothesis: Herring bycatch will be greater inside than outside the CVOA, unless pollock fishing pressure shifts dramatically into area 522 around the winter herring savings area.

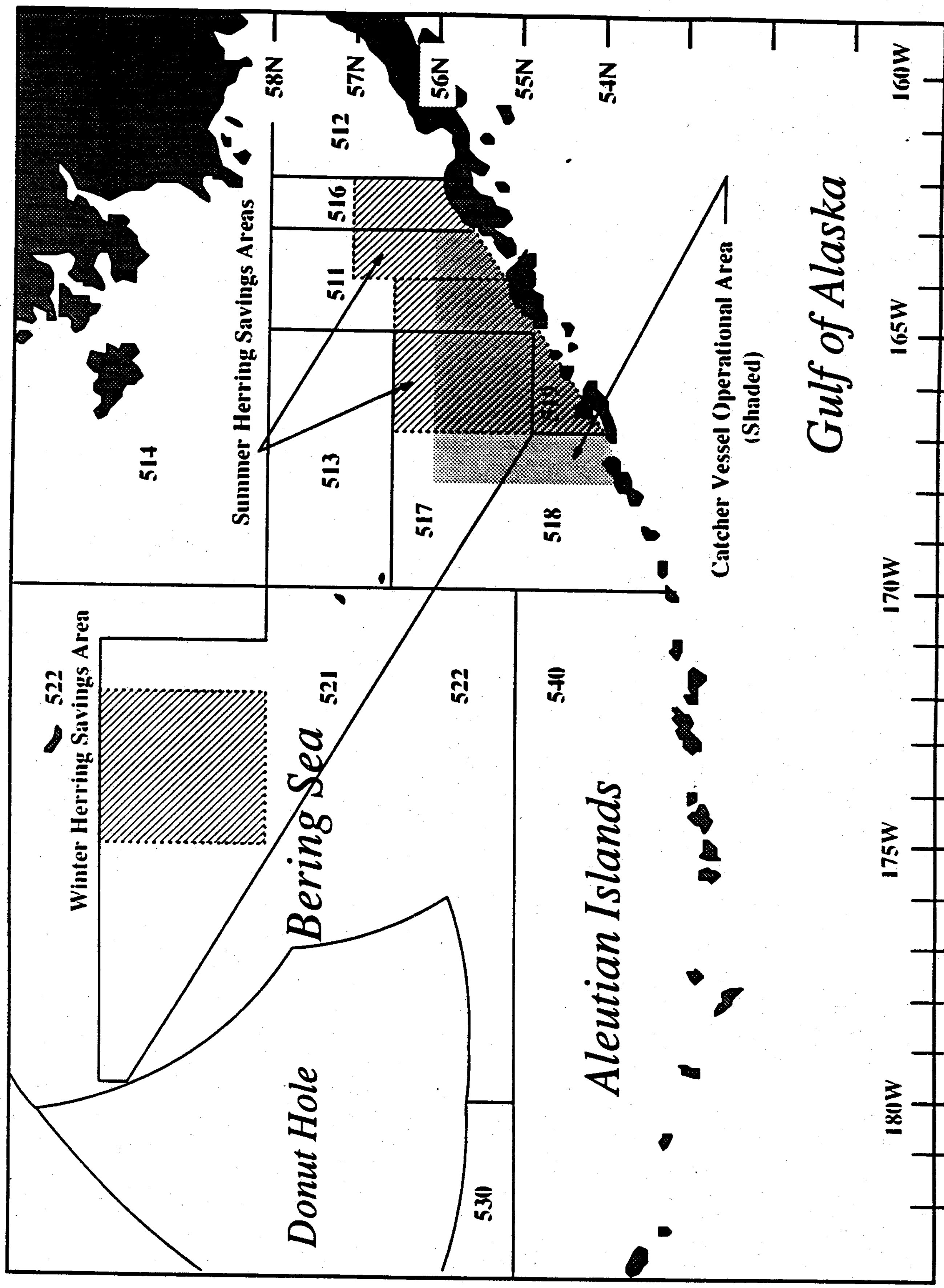
   Reasoning: Large schools of herring are known to migrate through False Pass and other passes in the Aleutian Islands, then migrate through the CVOA northward toward Togiak and Norton Sound. In fact, the herring densities in the southern portion of Bristol Bay in the summer months led to the establishment of the Summer Herring Savings Areas, see Figure 4.4, which to a large degree corresponds with the area encompassed by the CVOA. The winter herring savings area to the north of the Pribilofs may indicate that herring bycatch could be a problem should more pollock fishing take place in that area in the future.

3) Hypothesis: Red King Crab bycatch will be greater outside than inside the CVOA.

   Reasoning: Historically Red King Crab biomass and harvest activity has been centered in Bristol Bay [ADF&G, 1992] Although a large portion of Bristol Bay lies inside the CVOA, the majority of the Bristol Bay Red King Crab biomass lies just north and west of the zone, as seen in Figure 4.5.

4) Hypothesis: Other King Crab bycatch will be greater outside than inside the CVOA.

   Reasoning: Other King Crab stocks consist mainly of Pribilof Island Blue King Crab and St. Matthew Island Blue King Crab. These stocks exist almost entirely outside the CVOA, therefore little bycatch of these species is expected. See Figure 4.6.



514
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522
540
530
Summer Herring Savings Areas
Winter Herring Savings Area
Catcher Vessel Operational Area
(Shaded)
Bering Sea
Donut Hole
Aleutian Islands
Gulf of Alaska
58N
57N
56N
55N
54N
160W
165W
170W
175W
180W

Figure 4.4

Figure 4.5

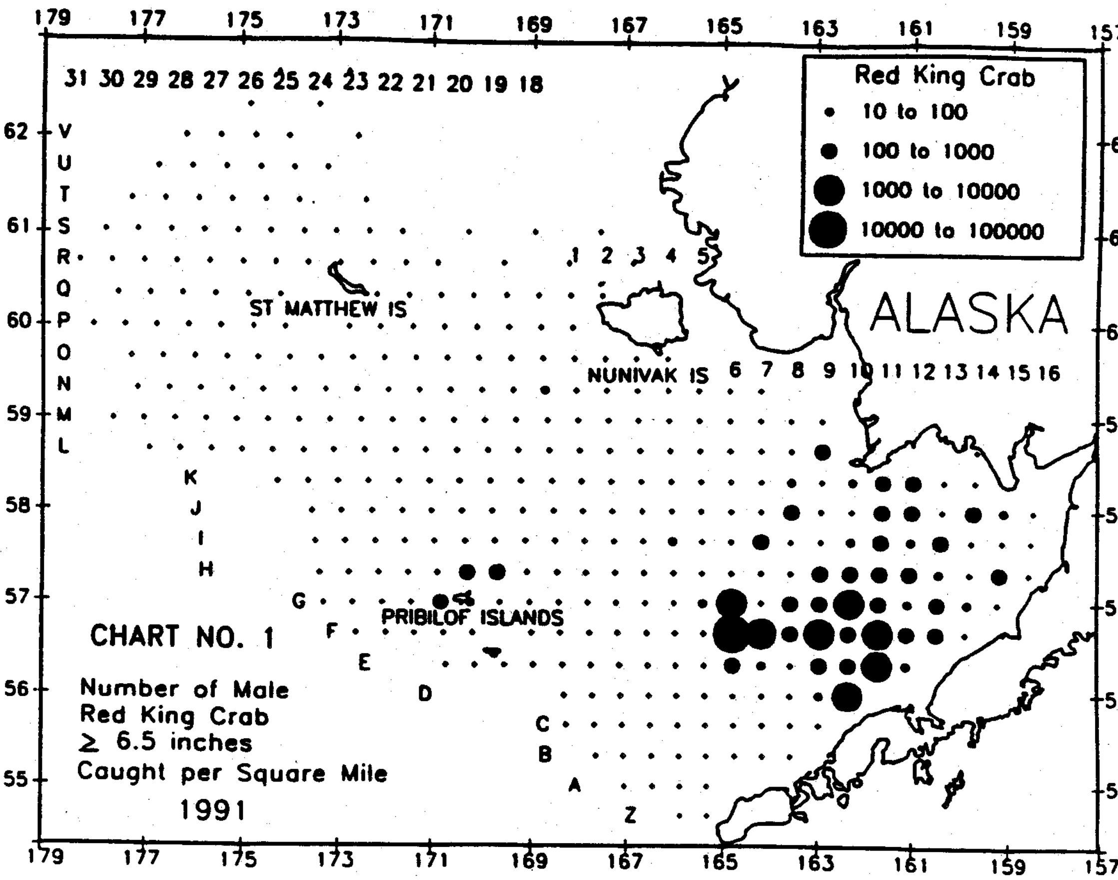
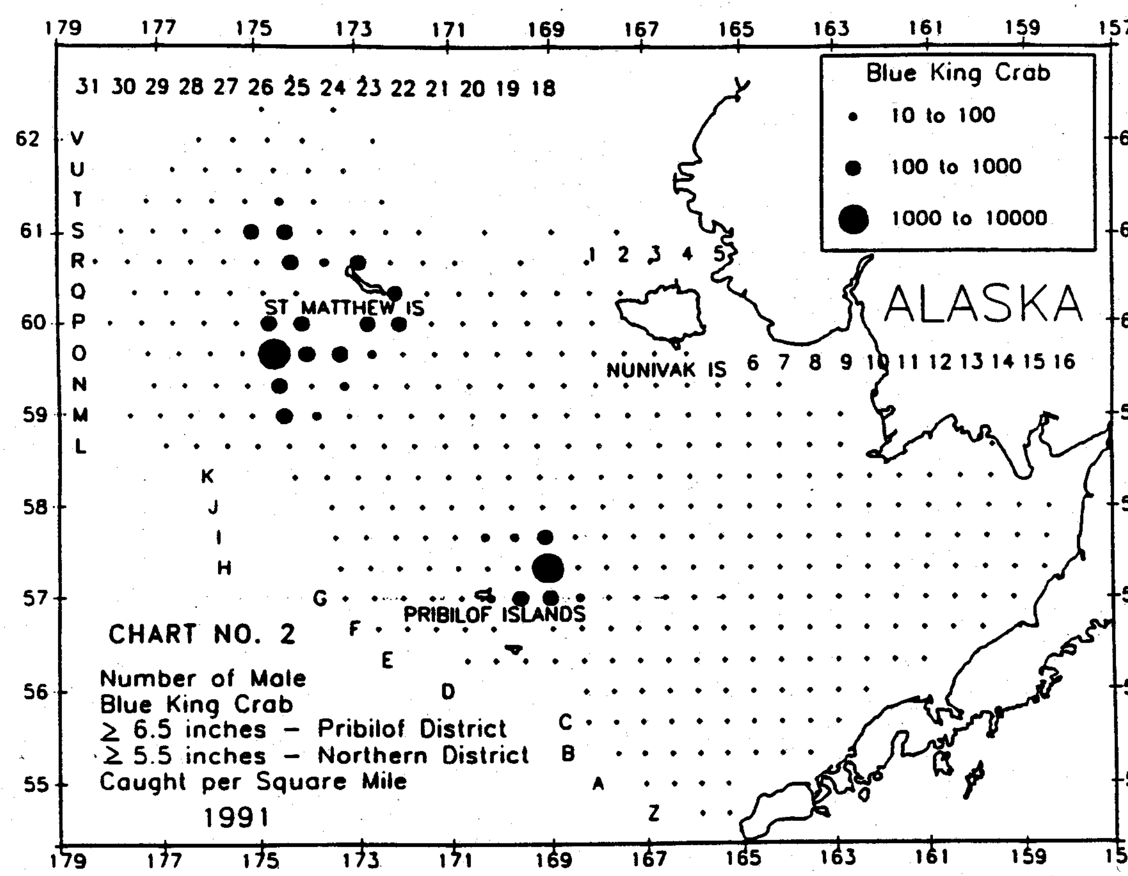


Figure 4.6



Source: ADF&G, 1992, p26, p27

5) Hypothesis: Bairdi Tanner Crab bycatch will be the same inside and outside the CVOA.

Reasoning: Major biomass densities of *C. Bairdi* occur both inside the CVOA and outside the CVOA. See Figure 4.7.

6) Hypothesis: Other Tanner Crab bycatch will be greater outside than inside the CVOA.

Reasoning: The largest portion of the biomass of *C. Opilio*, which constitutes the great majority of the Other Tanner Crab bycatch, lies outside the CVOA. See Figure 4.8.

7) Hypothesis: Halibut bycatch will not be different inside and outside of the CVOA.

Reasoning: Figure 4.9a [IPHC, 1987 p6] shows the presence of a major halibut fishing grounds inside the CVOA. It also show other smaller fishing grounds just south of the Pribilofs and around St. Matthew's Island. Figure 4.9b [IPHC, 1987 p42] shows the large area in the eastern portion of Bristol Bay where there are large concentrations of juvenile halibut. This area is mostly outside of the CVOA. Therefore the large halibut fishing area and presumably large biomass inside the CVOA is offset by the high concentration of juveniles in the closed area outside the area.

Figure 4.7

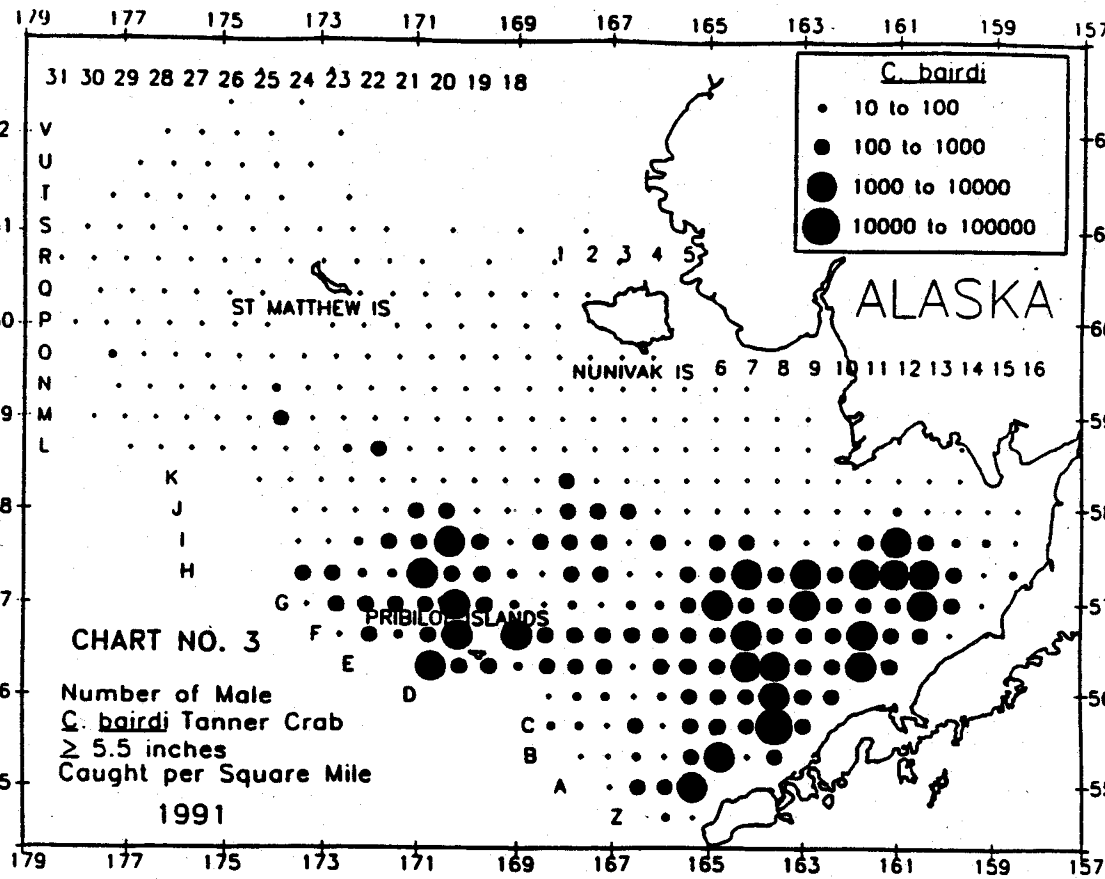
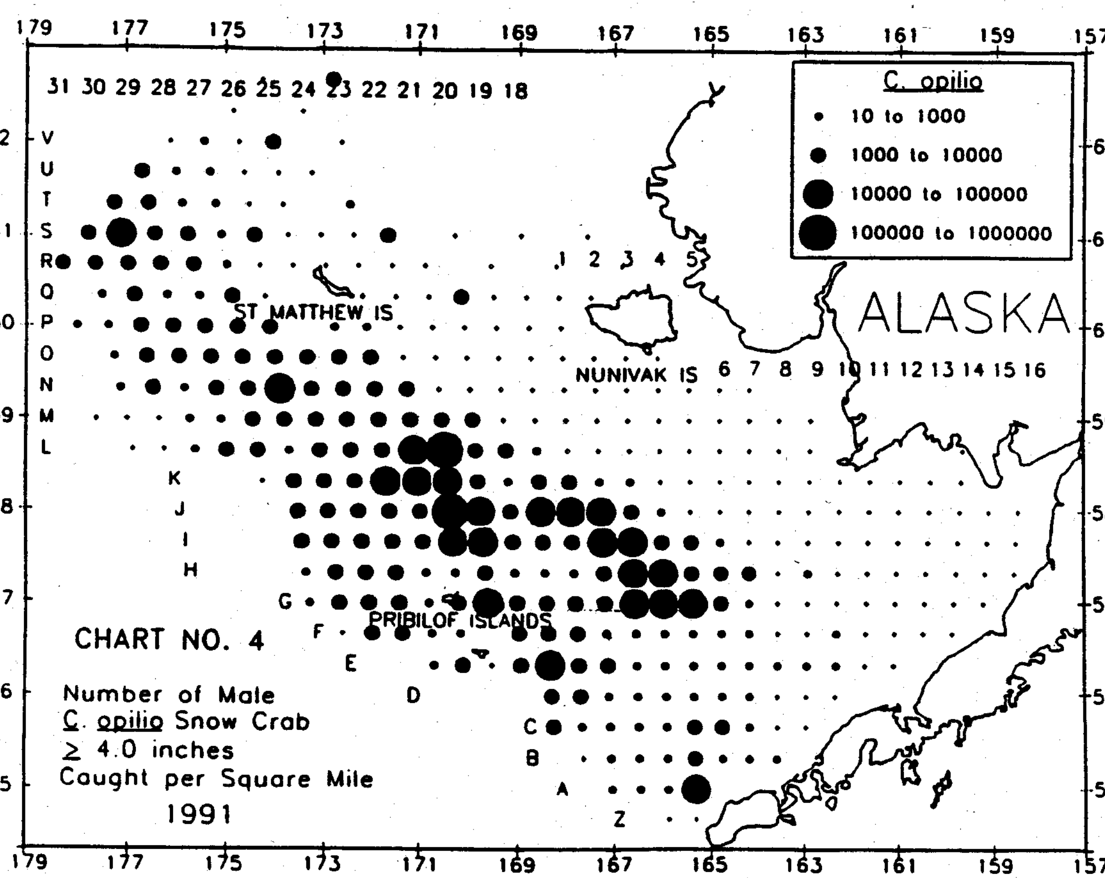


Figure 4.8



Source: ADF&G, 1992, p28, p29

Figure 4.9a

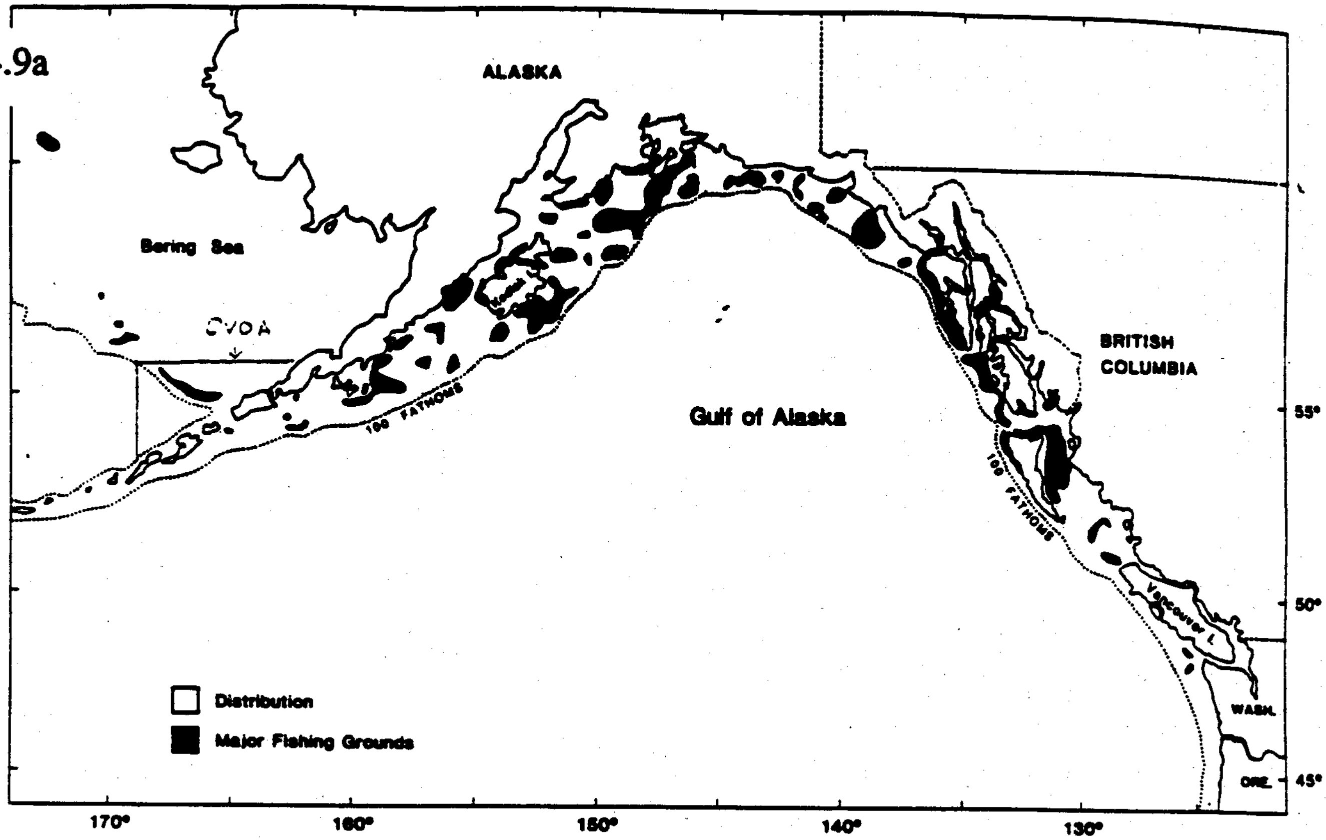
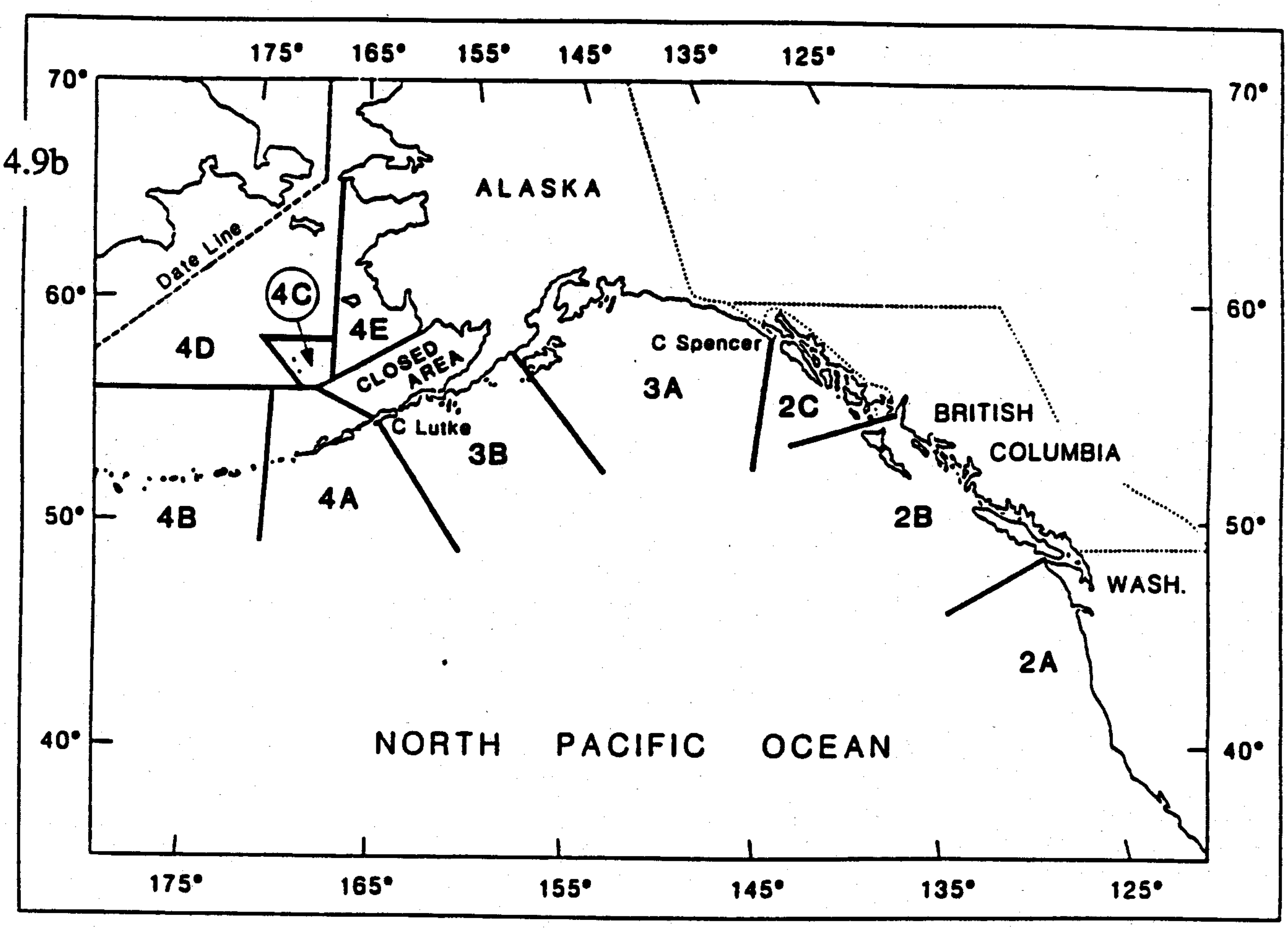


Figure 4.9b



Source: IPHC Technical Report 22, 1987

4.3.4.2 Analysis

Analysis of bycatch rates from observer data from 1981-1990 was undertaken. Bycatch rates for eight prohibited species were examined. Time constraints however, precluded conclusive statistical testing of the rates, so all findings and inferences must be regarded as preliminary.

Dr. Jim Norris of Marine Resources summarized CPUE and byeatch rates from the NORPAC data base for foreign, JV, and domestic pollock fisheries over the years 1984 - 1990. Detailed results have been assembled in four lengthy volumes which are available at the NPFMC offices for examination. Each volume summarizes CPUE and bycatch rates from the Bering Sea/Aleutian Islands pollock (bottom and midwater) trawl fisheries for the period 1981-1990. Volume I combines data from all fisheries--domestic, joint venture, foreign, and mothership. Volumes II-IV cover the domestic, joint venture, and foreign fisheries separately. Each volume contains summary data for twelve variables of interest--observed tons, observed tows, total CPUE, pollock CPUE, and bycatch rates for chinook salmon, other salmon, Pacific halibut, Pacific herring, red king crab, other king crab, Bairdi Tanner crab, and other Tanner crab. Data are summarized over management area, month, quarter, and year. Bycatch rates for each PSC were calculated using total catch per tow the denominator, than rather catch of pollock.

Figures 4.10a and 4.10b summarize catch and bycatch rates for all pollock fisheries in the study for both bottom and pelagic gear combined. The figures are not substitutes for rigorous statistical analysis and should not be viewed as conclusive, however some inferences can be drawn which can then be compared to the *a priori* hypothesis as stated above. It should be noted that any inferences drawn here relate to past performance and given the dynamic nature of the fishery, and will not necessarily hold in the future.

4.3.4.3 Inferences

1) It is unlikely that Chinook salmon and other salmon bycatch rates were greater outside the CVOA than inside. It is possible that salmon bycatch rate inside may be greater than outside the CVOA. These inferences do not disagree with the hypothesis, i.e., we can not reject our *a priori* hypothesis.

2) It is unlikely that herring bycatch rates are less outside the CVOA than inside the CVOA, although the evidence in recent years is less clear than in the foreign fishing years of 1981-1984. These inferences do not allow the rejection of our *a priori* hypothesis. The case for herring is a prime example of the limits of our analysis. If pollock fishing shift dramatically to the north toward the winter herring savings area than bycatch rates there could increase.

3) Red King Crab bycatch was no different inside the CVOA than outside the CVOA except for 1985 and 1986 when it was higher inside than outside the CVOA. Here our *a priori* hypothesis of greater bycatch outside the zone than inside, disagrees with the findings of the data. At the risk of making a *type I* error, we would reject our *a priori* hypothesis.

4) Other King Crab bycatch was generally higher outside the CVOA than inside the CVOA, although in recent years the data seems mixed. This agrees with our *a priori* hypothesis and therefore we cannot reject it.

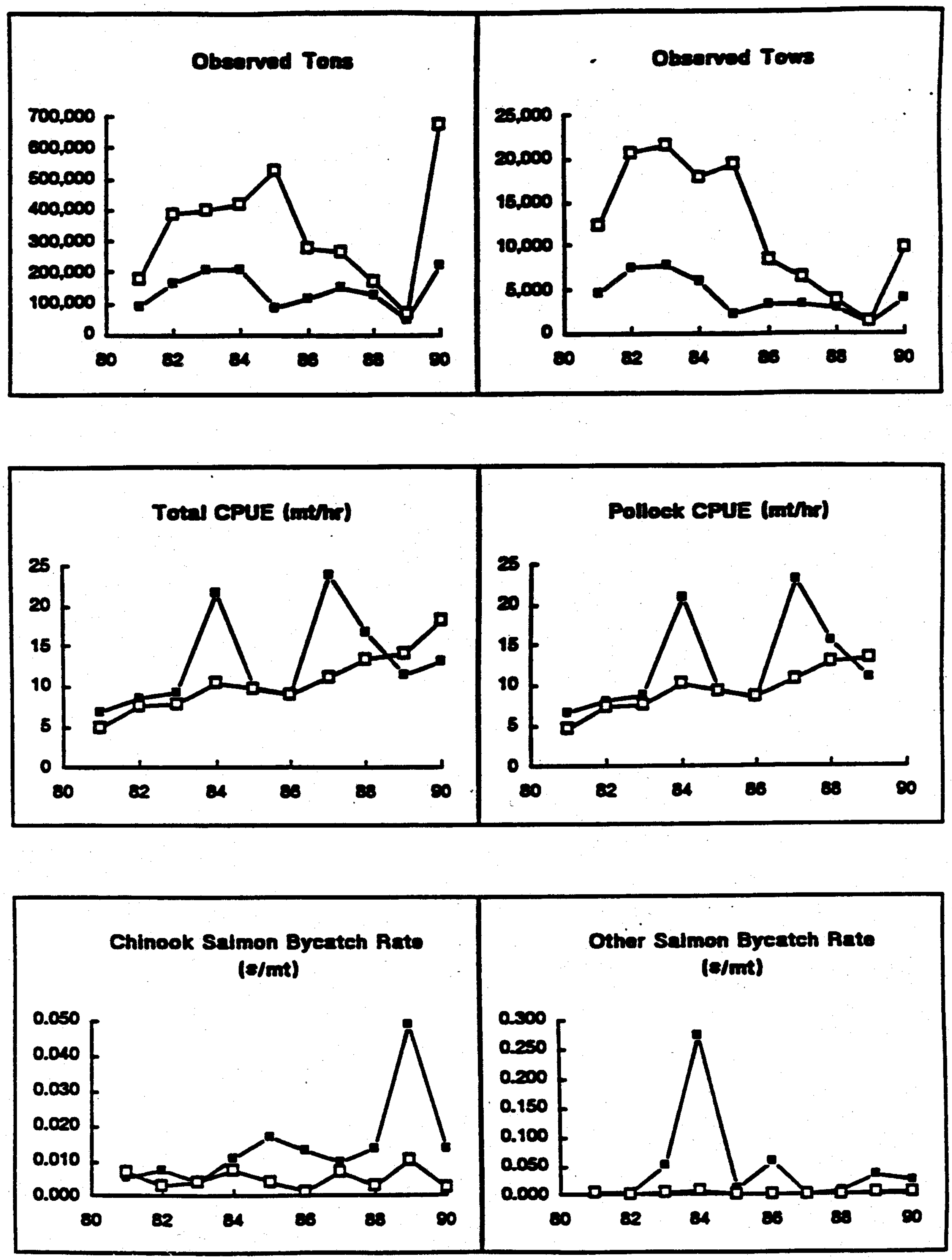
5) Bairdi Tanner Crab bycatch rates are generally higher inside the CVOA than outside. This disagrees with our *a priori* hypothesis, and therefore we reject it and conclude that C. Bairdi bycatch rates are higher inside than outside the CVOA.

Figure 4.10a

ALL Fisheries

Pollock (Bot + Mid)

Open Squares = Outside Area
Solid Squares = Inside Area



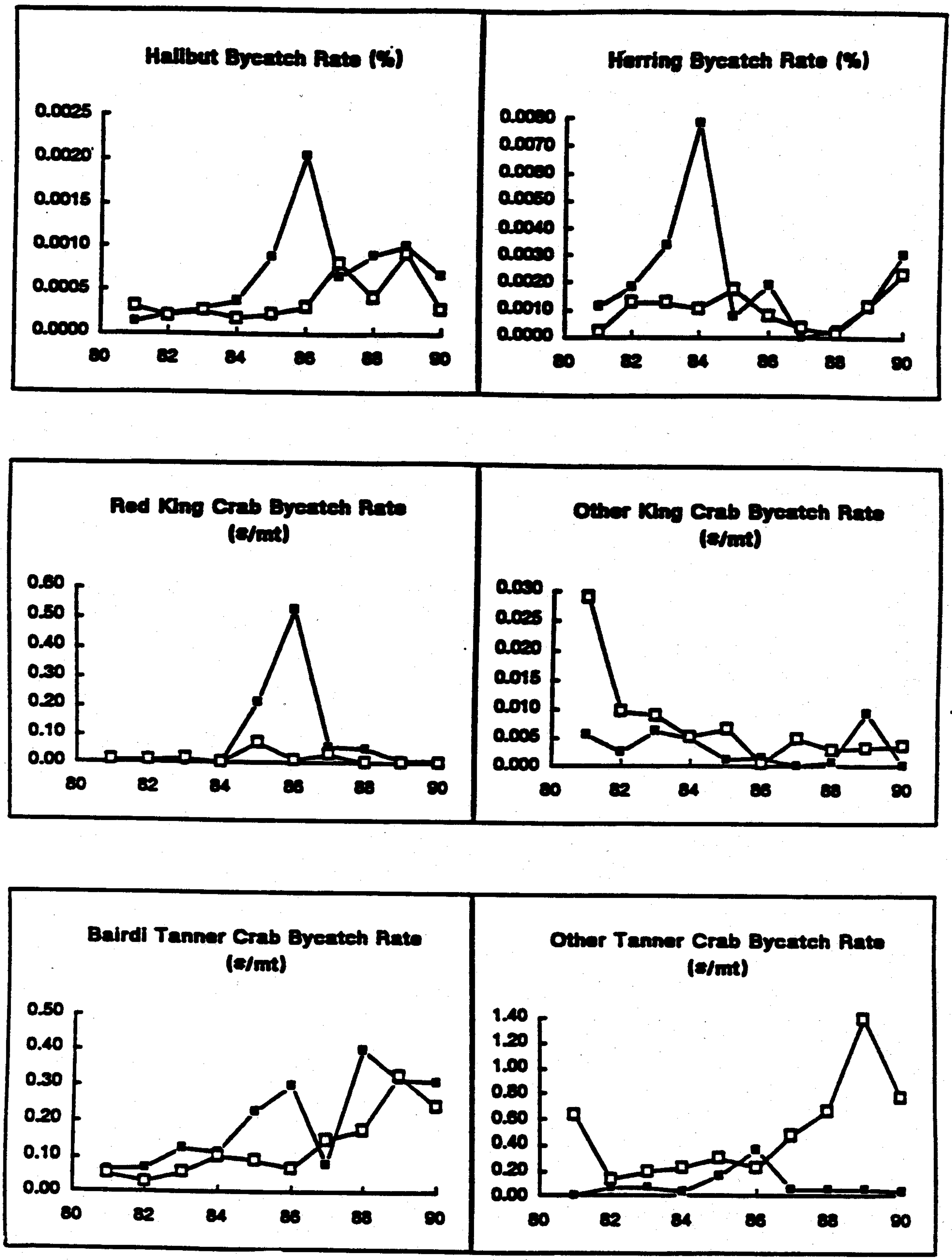
Source: Norris, 1992

Figure 4.10b

ALL Fisheries

Pollock (Bot + Mid)

Open Squares = Outside Area
Solid Squares = Inside Area



Source: Norris, 1992

6) Other Tanner Crab bycatch rate are higher outside the CVOA than inside the CVOA. This agrees with our *a priori* hypothesis.

7) Halibut bycatch rate appear generally higher inside than outside the CVOA. This disagrees with our *a priori* hypothesis of no difference. We would however be unlikely to reject our *a priori* hypothesis until further study.

4.3.5 Sector Dependence on the CVOA: Is one processing sector more dependent on the CVOA than the other sector?

The CVOA is obviously a very important fishing area. Table 4.8 shows the amount of pollock removals and percentages by different sectors inside and outside the CVOA. Sectors here have been defined somewhat differently in order to demonstrate the relatively importance of the CVOA to "At-Sea" delivery vessels. The sectors listed here are: Catcher/Processors, Mothership Deliveries (domestic), Joint Venture Deliveries, and Inshore Harvestors. It is emphasized that 1990 Catcher/Processor data, and Mothership Delivery data are known to contain reporting errors that overstate actual levels of harvest. As a result, the 1990 fish ticket data should be viewed as representational only. In 1991, vessels processing in the EEZ were not required to submit fish tickets, and a significant number of processors chose not to, therefore the 1991 data understate actual harvest levels.

Table 4.8 illustrates that catcher/processors have been significantly less dependent on the CVOA over time. Joint Venture operators are no longer active, but during the years 86-89 this fleet caught approximately 50% of their pollock from the CVOA. Mothership deliveries appear heavily dependent on the CVOA, except in 1990. The inshore sector has depended on the CVOA almost exclusively since 1986. It is apparent that all sectors rely on fishing areas both inside and outside the CVOA to varying degree in different years. These differences are likely related to fishing conditions at the time. Recall that 1990 CPUEs were higher outside the CVOA than inside. All sectors utilized the CVOA less in 1990 than in an "average" year. Another year may find CPUE higher inside the CVOA and therefore more effort would probably be expended in this area.

4.3.6 Catcher Vessel and Processing Constraints: Are there constraints or limits on catcher vessels which preclude them from operating outside the CVOA? Similarly are there constraints on processors which preclude them from taking deliveries of pollock from outside the CVOA?

According to Alvin Burch of the Alaska Draggers Association out of Kodiak, a pioneer in American surimi processing, and a member of the Advisory Panel, [personal communication, 1992] pollock need to be processed no longer than 3 days from the time the first fish are caught. After 5 days one can notice a dramatic drop in recovery rates. If fishing is poor, (scratch fishing) a vessel might be able to get 30 tons per day and if 100 tons is needed to fill the hold, the vessel would take three days to get back to port. Generally however, scratch fishing is not the case.

According to Burch, vessels in the 1992 "B" season are running up to 200-220 miles from the processors, and with average running speeds of 9-10 knots they will be running up to 20 hrs. But as he points out, higher speeds are possible, but higher speeds means a loss of efficiency.

He also noted that the Japanese were taking fish out of the Donut Hole, were running to Hokaido with ice boats, and processing surimi there. All those fish were 14 days old and they were still making surimi out of it, however it was of low quality. The fresher fish has higher quality, however fish processed before rigor sets in, does not make a high quality product. Recovery rates and quality increase post rigor up to a certain point then start to fall back.

Table 4.8

Historical Dependence on the CVOA by Sector.

		1986	1987	1988	1989	1990 /1	1991 /2
Catcher/ Processors /3	Outside CVOA (mt)	324	8,364	81,911	419,545	748,583	548,014
	% of CP Total	10%	23%	30%	54%	90%	79%
	Inside CVOA (mt)	3,055	27,341	195,284	361,254	85,289	149,443
	% of CP Total	90%	77%	70%	46%	10%	21%
	CP Total (mt)	3,379	35,705	277,195	780,799	833,872	697,457
	% of BSAI Total	0%	3%	21%	58%	62%	68%

		1986	1987	1988	1989	1990 /1	1991 /2
Mothership Deliveries /4	Outside CVOA (mt)	10,554	7,362	1,792	9,362	208,931	15,644
	% of Mothership Total	38%	16%	3%	25%	97%	26%
	Inside CVOA (mt)	17,093	40,089	57,218	27,503	5,741	45,258
	% of MOthership Total	62%	84%	97%	75%	3%	74%
	Mothership Total (mt)	27,648	47,452	59,010	36,866	214,672	60,902
	% of BSAI Total	3%	4%	4%	3%	16%	6%

		1986	1987	1988	1989
Joint Venture Deliveries /5	Outside CVOA (mt)	186,314	586,511	431,175	155,729
	% of JV Total	22%	56%	52%	54%
	Inside CVOA (mt)	647,554	457,966	394,419	132,058
	% of JV Total	78%	44%	48%	46%
	JV Total (mt)	833,868	1,044,477	825,594	287,787
	% of BSAI Total	94%	85%	61%	21%

		1986	1987	1988	1989	1990	1991
Inshore /6	Outside CVOA (mt)	3,004	1,164	405	32,314	34,304	19,344
	% of Inshore Total	17%	1%	0%	13%	12%	7%
	Inside CVOA (mt)	15,061	93,729	185,492	217,630	256,390	252,203
	% of Inshore Total	83%	99%	100%	87%	88%	93%
	Inshore Total (mt)	18,065	94,894	185,897	249,943	290,694	271,547
	% of BSAI Total	2%	8%	14%	18%	22%	26%

		1986	1987	1988	1989	1990 /1	1991 /2
BSAI Total /7	Outside CVOA (mt)	200,197	603,401	515,284	616,950	991,818	583,002
	% of BSAI Total	23%	49%	38%	46%	74%	57%
	Inside CVOA (mt)	682,764	619,126	832,413	738,444	347,420	446,904
	% of BSAI Total	77%	51%	62%	54%	26%	43%
	BSAI Total (mt)	882,960	1,222,527	1,347,696	1,355,395	1,339,237	1,029,906
	% of BSAI Total	100%	100%	100%	100%	100%	100%

/1 1990 fish tickets overstate offshore pollock harvests. The data should be viewed as representational only.
/2 In 1991 offshore processors were no longer required to submit fish tickets and therefore the data are understated.
/3 Domestic Catcher/Processor harvests only.
/4 Domestic Mothership deliveries only.
/5 Joint Venture deliveries only.
/6 Domestic Inshore deliveries only.
/7 All DAP and JVP harvests, does not include directed foreign fishing removals which are shown in Table 4.1.

Steve Hughes, of the Midwater Trawler's Co-op [personal communication, 1992] has a slightly different view of the constraints on catcher vessels. He says that most modern trawlers have refrigerated salt water temperature recorders in each of the vessels holds. At the time the first fish goes in, the recorder is started and it logs the date and time. From that time, the vessel has 30 hours to deliver the fish to the processor. If any fish in a given hold are over 30 hours old, the fishermen starts to lose value. The amount of the penalty goes up by the hour, is quite significant, and takes the value of the fish away fast. Each vessel will have at least three such fish holds.

Hughes goes on to say that most Bering Sea shoreside vessels now have, on average, a 350 MT hold capacity. During the "A" season full trips are normal, with the majority of trips from 24 hours to 36 hours. Nobody get penalized during the A season. The B season is a lot less predictable. A lot of fishing in the B season gets done north of the proposed CVOA; 200 miles would not be an unreasonable trip. Figuring that some boats will travel at 14 - 15 knots, a vessel going out 200 miles would have approximately 15 hours to fill the hold. In that case most vessels would start fishing at their northernmost point and tow in a southerly direction.

Hughes also points out that an agreement was reached during the June 1991 Council meeting between catcher vessels, shore based processors, and mothership processors, stating that motherships processors should be allowed to operate within the CVOA. With regard to at-sea catcher boats, Hughes noted that they may tow a codend 2-5 miles, but more than that would damaged the fish, and result in torn nets.

To summarize, shore based catcher vessels are limited to harvesting within approximately 200 miles from the processing facilities. Figure 4.1 at the beginning of this chapter shows a line draw 200 miles from Dutch Harbor and Akutan, the major existing shore based processing areas in the BSAI. As is readily apparent the CVOA is a much smaller area. One could argue then that the CVOA does not adequately capture the range of the shore based catcher vessels, and therefore is inappropriate. Conversely, one could conclude that since the CVOA does not include the full range of the catcher vessels it represents a good compromise.

Other limits on catcher vessels beside delivery time, include their (1) the inability to withstand inclement weather in open water, and (2) the expense and running time to port for provisions (important in the case of at-sea delivery vessels.

4.3.7 Ice and Weather Conditions: Will the CVOA increase the likelihood that vessels will have encounters with inclement weather, rougher seas, and the ice edge?

For any change in the probability of these environmental effects to occur, two conditions must be met: (1) Vessels will move to an area in which they have previously not used to the same extent, and (2) the weather, seas, and ice conditions are worse in the new location than the previous.

It is assumed that vessels in the offshore sector will move to the north and west if the CVOA is implemented. How far north and how far west is unknown. Certainly Zones 521 and 522 are known to have high concentrations of pollock, and it can be expected that fishing effort would increase at least in the southern portions of these areas. If this is true then condition 1 can be said to be met. Are weather and sea conditions any worse in these areas than in areas further south? Unfortunately because of the time constraints on this analysis, weather and sea condition data were not available. However, if these proved to be worse in the areas around the Pribilofs than in the CVOA, then it could be said that condition 2 was met for weather and sea conditions. In that case both conditions would be met and the offshore sector would be worse off.

Data regarding the ice edge is more readily available. The probability of the ice edge location on January 1, and March 15 are shown in Figures 4.11 and 4.12 respectively. On January 1, there is a zero probability that the ice edge will be farther south than St. Paul Island. [LaBelle, 1983] There is less than 50% probability that the ice edge will have reached St. Matthews Island. However on March 15, there is a better than 25% chance that the ice edge will be beyond St Paul Island and greater between 75% and 100% probability that the ice edge will be beyond St. Matthews Island. Clearly the location of the ice edge would restrict any fishing activity and therefore it is very likely that condition 2 will be met for ice conditions. And if condition 1 is true, i.e., the offshore sector fishes more north westerly area more intensively, then one could conclude that ice will more often constrain offshore fishing effort if the CVOA is implemented.

4.3.8 Gear Conflicts: Will there be more gear conflicts because of the CVOA

This question arises from the assumption that the offshore sector will go northward and westward if excluded from the CVOA. As seen in Figures 4.5 - 4.8 north and west of the CVOA are large biomasses of both King and Tanner crab. In recent years the Bering Sea crab fishing season has been conducted from October through March. Figure 4.13 attempts to show the location of crab pots in the first quarter in 1991. Note that the orientation of the figure is unconventional in that North goes from the right of the page to the left. The Aleutian Islands and the Alaskan Peninsula would run along the left border of the page and Bristol Bay along the bottom. The CVOA is indicated by the shaded area in the bottom left quarter. The figure shows that the highest density of crab pots in the first quarter is, not surprisingly, in the area of 170°-172° W. longitude and 56°-57° N. latitude. This corresponds with earlier figures showing major crab biomasses. If in fact the offshore sector chooses to increase the intensity of their effort in these areas, there is a greater likelihood of gear conflicts[2].

4.3.9 Marine Mammals and Seabirds: Will the creation of the CVOA have effects (positive of negative) on marine mammal or seabirds populations inside the CVOA or outside the CVOA?

The potential effects of the inshore offshore allocation on marine mammals and seabirds were summarized in the original SEIS/RIR/IRFA [NPFMC, 1992a]. Since this current analysis is a supplementary analysis of the inshore/offshore issue, the original SEIS and the Section 7 consultation undertaken in February 1992, are implicitly included as reference. The Section 7 consultation concludes that the "inshore/offshore allocation proposed is not likely to jeopardize the continued existence of any listed species under the jurisdiction of the NMFS, including Steller (Northern) Sea Lions." [Pennoyer, 1992]

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[2]As a footnote to the previous section, it should be pointed out that the majority of vessels fishing for crab are more comparable in size to catcher vessels than to catcher processors. It is also well known that the crab fishery endure horrendous weather conditions making it one the deadliest fisheries in the U.S. [Kennedy, 1992, personal communication].

Figure 4.11 Ice Edge Location on January 1.

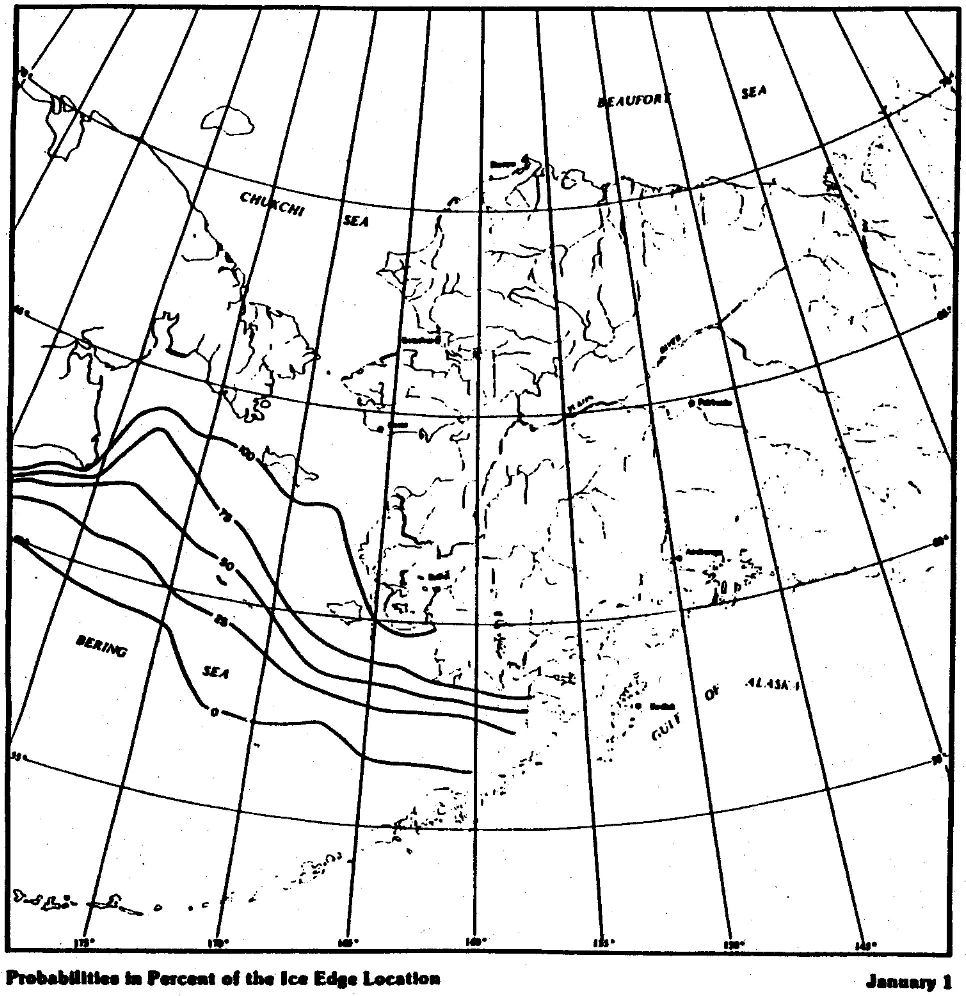
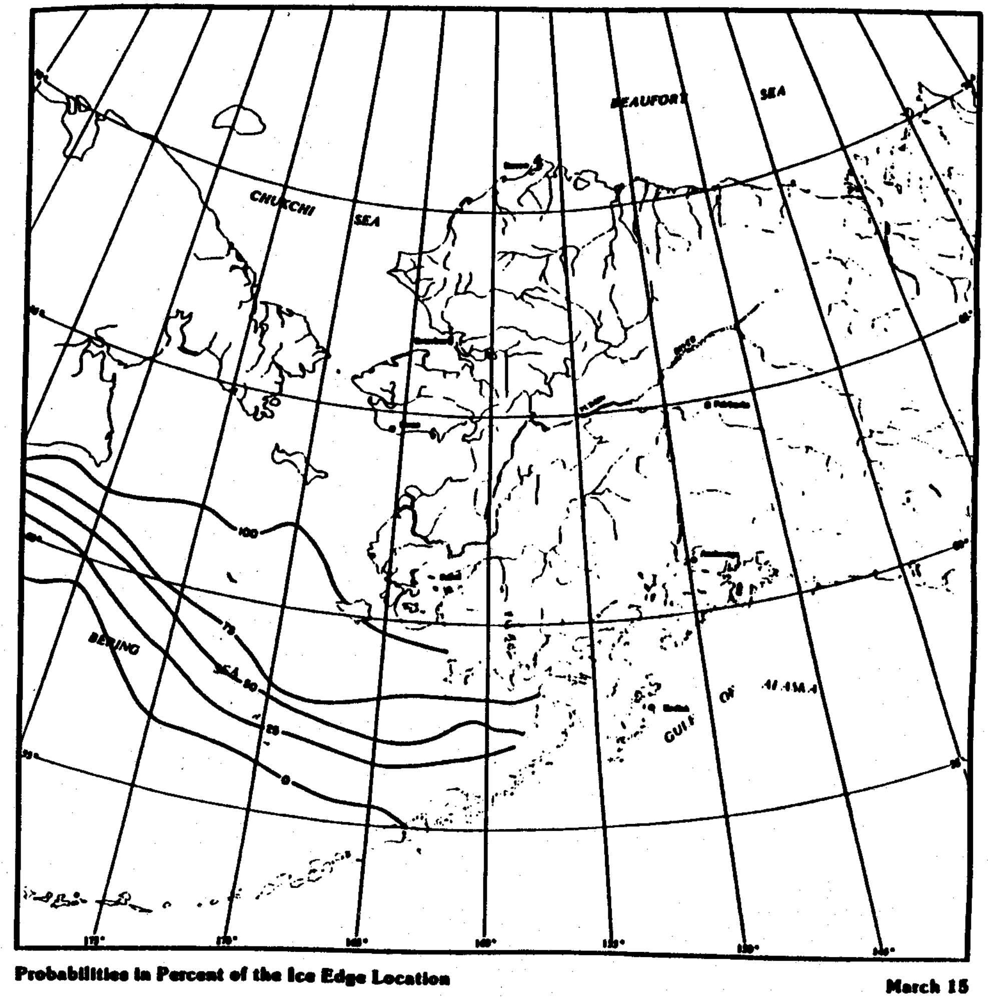
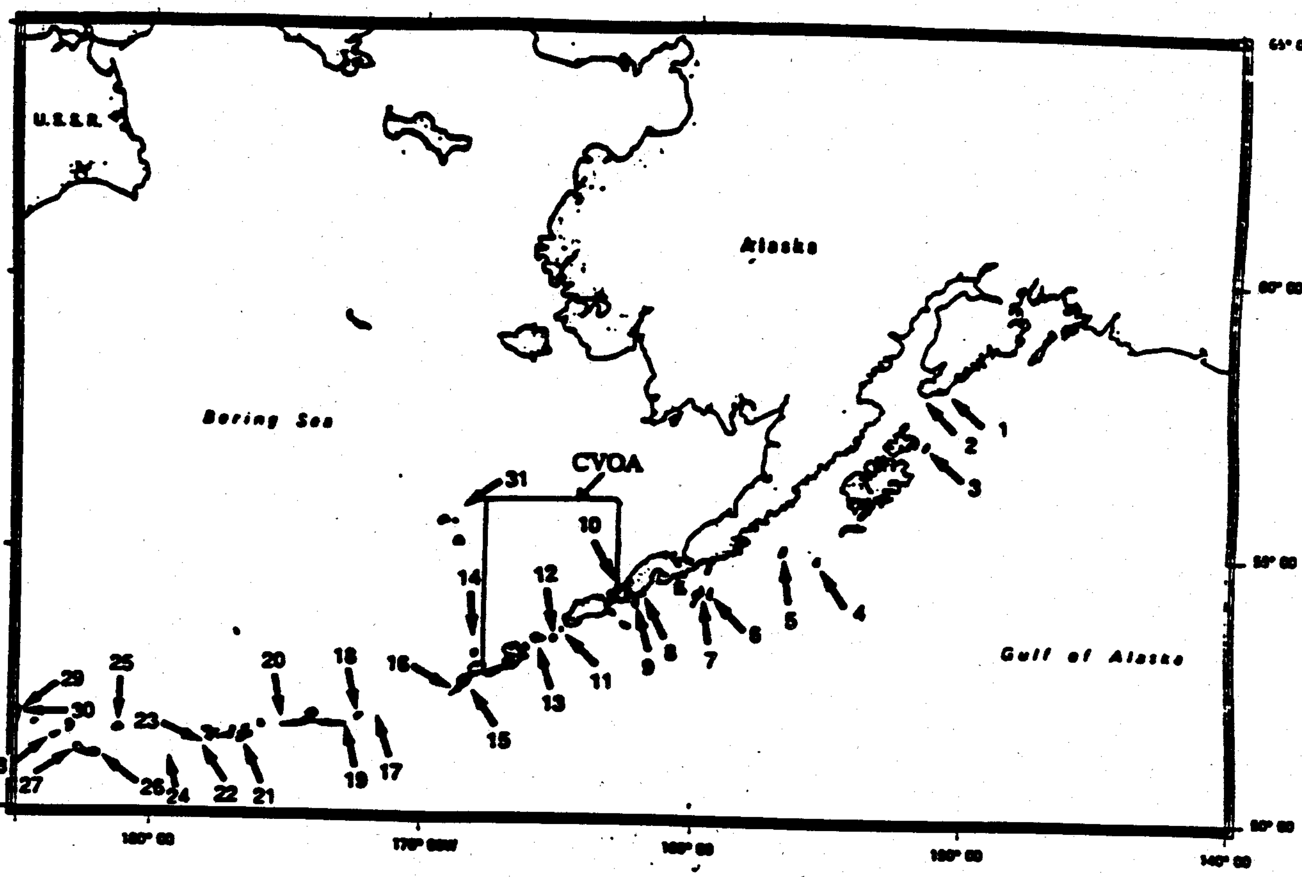


Figure 4.12 Ice Edge Loaction on March 15.



Source: LaBelle, 1983, Alaska Marine Ice Atlas

Figure 4.14 Northern Sea Lion Rookeries in the Gulf of Alaska and the Eastern Bering Sea



Island	From Latitude	From Longitude	To Latitude	To Longitude	NOAA Chart	Notes
1. Outer I.	59°20.5 N	150°23.0 W	59°21.0 N	150°24.5 W	16681	S quadrant.
2. Sugarloaf I.	58°53.0 N	152°02.0 W			16580	Whole island.
3. Marmot I.	58°13.0 N	151°48.0 W	58°09.5 N	151°52.0 W	16580	SE quadrant.
4. Chirikof I.	55°47.5 N	155°33.5 W	55°46.5 N	155°43.0 W	16580	S quadrant.
5. Chowiet I.	56°02.0 N	156°41.0 W	56°01.5 N	156°44.0 W	16013	S quadrant.
6. Atkins I.	55°03.5 N	159°18.5 W			16540	Whole island.
7. Chernabura I.	54°47.5 N	159°31.0 W	54°45.5 N	159°33.5 W	16540	SE corner.
8. Pinnacle Rock	54°46.0 N	161°46.0 W			16540	Whole island.
9. Clubbing Rks (N)	54°43.0 N	162°26.5 W			16540	Whole island.
9. Clubbing Rks (S)	54°42.0 N	162°26.5 W			16540	Whole island.
10. Sea Lion Rks.	55°28.0 N	163°12.0 W			16520	Whole island.
11. Ugamak I.	54°14.0 N	164°48.0 W	54°13.0 N	164°48.0 W	16520	E end of island.
12. Akun I.	54°17.5 N	165°34.0 W	54°18.0 N	165°31.0 W	16520	Billings Head Bight.
13. Akutan I.	54°03.5 N	166°00.0 W	54°05.5 N	166°05.0 W	16520	SW corner, Cape Morgan.
14. Bogoslof I.	53°56.0 N	168°02.0 W			16500	Whole island.
15. Ogchul I.	53°00.0 N	168°24.0 W			16500	Whole island.
16. Adugak I.	52°54.5 N	169°09.5 W			16500	Whole island.
17. Yunaska I.	52°42.0 N	170°38.5 W	52°41.0 N	170°34.5 W	16500	NE end.
18. Seguam I.	52°21.0 N	172°35.0 W	52°21.0 N	172°33.0 W	16480	N coast, Saddleridge Pt.
19. Agligadak I.	52°06.25N	172°54.0 W			16480	Whole island.
20. Kasatochi I.	52°10.0 N	175°31.0 W	52°10.5 N	175°29.0 W	16480	N half of island.
21. Adak I.	51°36.0 N	176°55.5 W	51°38.0 N	176°59.0 W	16460	SW point, Cape Yakak.
22. Gramp rock	51°29.0 N	178°20.5 W			16460	Whole island.
23. Tag I.	51°33.5 N	178°34.5 W			16460	Whole island.
24. Ulak I.	51°20.0 N	178°57.0 W	51°18.5 N	178°59.5 W	16460	SE corner, Hasgox Pt.
25. Semisopochnoi	51°58.5 N	179°45.5 E	51°57.0 N	179°46.0 E	16440	E quadrant, Pochnoi Pt.
25. Semisopochnoi	52°01.5 N	179°37.5 E	52°01.5 N	179°39.0 E	16440	N quadrant, Petrel Pt.
26. Amchitka I.	51°23.5 N	179°28.0 E	51°22.0 N	179°23.0 E	16440	East Cape.
27. Amchitka I.	51°32.5 N	178°50.0 E			16440	Column Rocks.
28. [unnamed I.]	51°45.5 N	178°24.5 E			16440	1 mi. SE of Ayugadak Pt.
29. Kiska I.	51°56.5 N	177°19.0 E	51°58.0 N	177°20.5 E	16440	W central, Lief Cove.
30. Kiska I.	51°53.0 N	177°13.0 E	51°54.0 N	177°14.0 E	16440	Cape St. Stephen.
31. Walrus I.	57°11.0 N	169°56.0 E			16380	Whole island.

[1] Each site extends in a clockwise direction from the first set of geographic coordinates along the shoreline at mean lower low water to the second set of coordinates; or, if only one set of geographic coordinates is listed, the site extends around the entire shoreline of the island at mean lower low water.

Source: Federal Register/Vol 55, No. 140/Friday July 20, 1990

Over 75 seabirds, waterfowl, and shorebird species breed, migrate, or overwinter in the Bering Sea or Gulf of Alaska. Of particular importance are Procellariiforms (shearwaters, fulmar, and storm petrels), Alcids (murres, auklets, puffins), and Larids (gulls and kittiwakes). Eight pinniped species, sea otters and at least 10 cetacean species occur in Alaskan waters in an annual or seasonal basis. These are:

Pinnipeds/Sea Otters
Northern sea lion (Eumetopias jubatus)
Northern fur seal (Callorhinus ursinus)
Pacific harbor seal (Phoca vitulina)
Spotted seal (Phoca largha)
Ringed seal (Phoca hispida)
Ribbon seal (Phoca fasciata)
Bearded seal (Erignathus barbatus)
Pacific Walrus (Odobenus rosmarus)
Sea Otter (Enhydra luris)

Cetacean
Fin whale (Balaenoptera physalus)
Sei whale (Balaenoptera borealis)
Humpback whale (Megaptera novaeangliae)
Sperm whale(Physeter macrocephalus)
Minke Whale (Balaenoptera actororostrata)
Beluga (Delphinapterus leucas)
Killer whale (Orcinus orca)
Dall's porpoise (Phocoenoides dalli)
Harbor porpoise (Phocoena)
Pacific white-sided dolphin (Lagenorthynchus obliquidens)

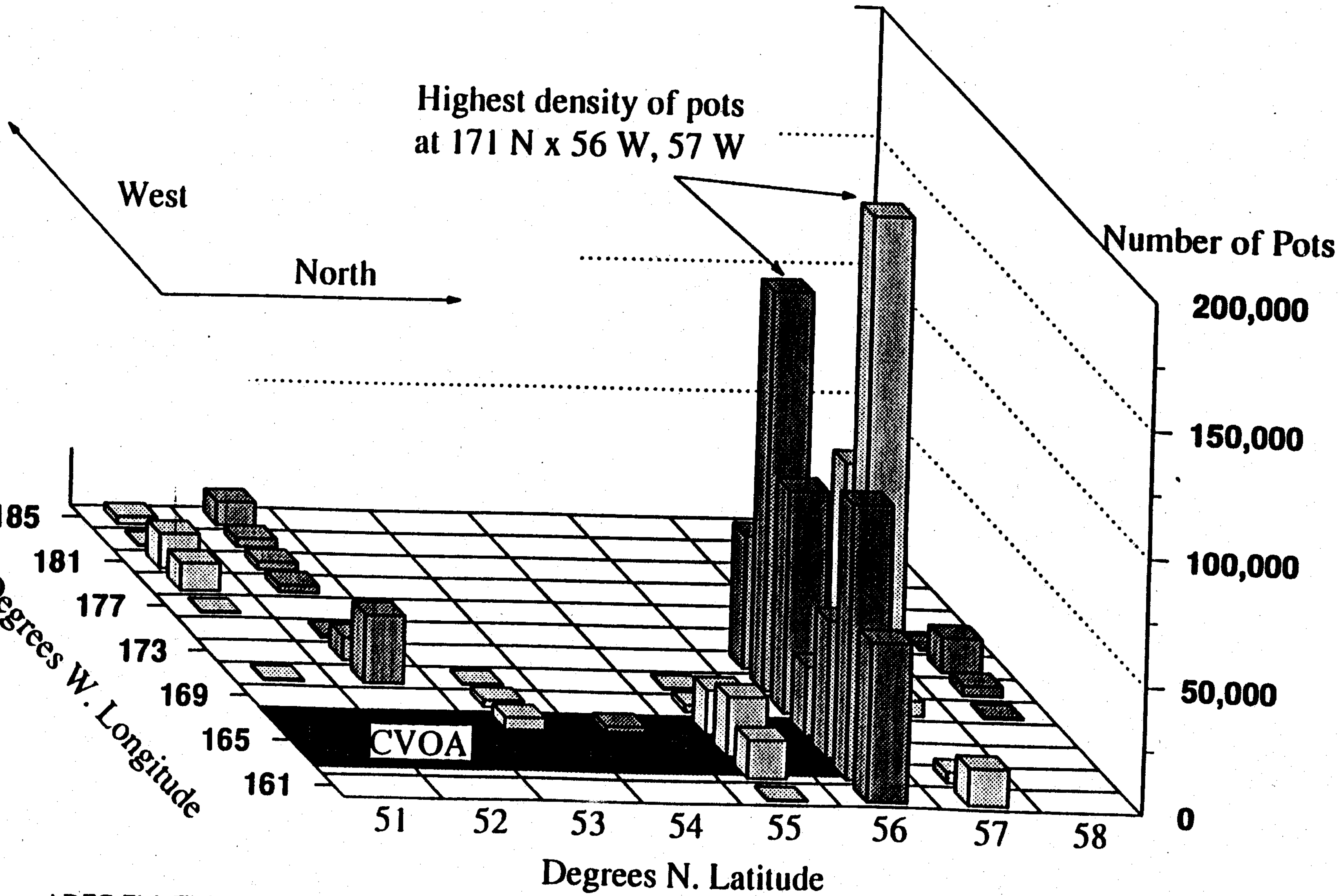
Amendment 20 to the FMP for the BSAI and Amendment 25 to the FMP for the GOA prohibited trawling within 10 miles of key Stellar sea lion rookeries in the GOA and BSAI. Further, Amendment 20 prohibited trawling within 20 miles of rookeries located at Sea Lion Rocks, Akun Island, Akutan Island, Seguam Island, and Agligadak Island during the "A" season for pollock. These amendments were implemented in 1992. Figure 4.14 and the accompanying table show the location of these rookeries.

Sea Lion Rocks (#10 on Figure 4.14) , Akun Island (#12), and Akutan Island (#13), 3 of the 5 rookeries assigned 20 mile buffer zones are inside the CVOA or adjacent to the CVOA. Additionally, Ugamak Island (#12) and Bogoslof Island (#14) are within or adjacent to the CVOA. Presumably, the action taken in Amendment 20 has alleviated to some extent any fishing/sea lion interactions around the rookeries. If a strict interpretation of the CVOA is used, i.e. no allowance for the offshore 'A' season, and no mothership processing in the area, then under any of the allocations, 30%-45%, potential removals would be less than the average since 1986 (see Tables 4.1 and 4.2), but only allocations of 35% or less would cap removals in the CVOA at levels less than what probably occured in 1991. If the offshore sector were allowed 65% of their 'A' season TAC from the CVOA and if motherships were allowed to process within the area, then potential removals could foreseeably increase over 1990 and 1991 levels, but would not likely exceed the maximum level of removals, which occured in 1988. Although there is no conclusive evidence linking pollock removals and the strength of the sea lion population, a system which limited the potential removals from the CVOA would appear to benefit sea lions using the area. However, displacing effort from one area to another puts additional pressure on mammals and birds in the new grounds.

If the offshore harvesting shifts effort to areas outside the CVOA, and those areas are sensitive for populations of mamm~~als or~~ seabirds then the possibility exists for negative impacts. It has been presumed that offshore effort would move north and westward toward the Pribilofs and perhaps even toward St Matthews Island. To the extent that interactions increase because of this shift or to the extent that food sources for these species are impacted then the implementation of the CVOA could have negative impacts on the marine mammals and seabirds.

Figure 4.13

Total Number of Crab Pots Fished
1st Quarter 1991
By Longitude and Latitude



Source: ADFG Fish Tickets, 1991

4.3.10 **Summary of Critical Issues:** Nine critical issues regarding the CVOA have been examined. How do each affect the different sectors of the industry?

4.3.10.1 Historical and Projected Removals of Pollock in the CVOA

The overall average level of removals between 1980 and 1991 from the CVOA was 445,123 mt. Since 1986 (the end of data from foreign fishing) the average has been 682,123 mt, and since 1989 (the end of significant JV fishing) the average has been 510,922 mt. If only inshore delivery vessels are allowed to participate in the CVOA projected removals could range from 380,280 mt to 570,420 mt, with allocation from 30% to 45% going to the inshore sector. If mothership deliveries are allowed, up to 35,000 mt more are projected to be removed from the CVOA. If 65% of offshore 'A' Season processing is allowed inside the CVOA then 196,098 mt (with a 30% inshore allocation) dropping down to 154,077 mt (with a 45% inshore allocation) could possibly be removed from the CVOA.

4.3.10.2 Length Frequency Data

Length frequency information shows that over the period 1981-1991, the pollock on average are longer inside the CVOA than outside the CVOA. The difference, though significant from a statistical point of view is small, from 2cm to 4cm. There was very little likelihood that the size of pollock, either inside or outside the CVOA, were less than 30cm on average, which according to industry sources is a minimum length. The data also show that the location of harvest does not account for much of the variance in length over the different years, and that in any given quarter it is not easy to predict whether fish harvested within the CVOA are longer than fish harvested outside. Clearly the dynamics of the pollock biomass are not explain by the location of harvest.

4.3.10.3 Catch Per Unit Effort

An examination of CPUE inside and outside the CVOA showed no significant differences overall. There were specific quarters in different fisheries for which CPUEs were significantly greater inside the CVOA than outside and vice versa. It is difficult to say whether any of the differences found were the result of actual differences in CPUE, the result of comparing "apple and oranges", or the because the data and models used were inadequate to capture the complexity of the issue. Clearly the fleet is changing over time and effort patterns are changing as well. Using information from the past to predict future effects is at best, a tool for understanding complex issues rather than as an actual predictor.

4.3.10.4 Bycatch of Prohibited Species

Bycatch of prohibited species is an issue both inside and outside the CVOA. It appears that *C. Bairdi*, and halibut bycatch rates may be higher inside the CVOA than outside. Bycatch rates of other Tanner Crab appear higher outside than inside the CVOA. There may be some evidence to indicate that salmon and herring bycatch rate are higher inside than outside the CVOA, but without further study is may be premature to make that assessment. Finally, there appear to be no significant differences in bycatch rates of Red King Crab. All of these apparent findings are preliminary and should be used with caution. Again it should be noted that, given the dynamics of the different biomasses, and in the fishing industry itself, interactions between the two are highly speculative.

4.3.10.5 Sector Dependence on the CVOA

Catcher vessels, shore based processors, and motherships--both inshore and offshore--appear to be more dependent (on a catch percentage basis) on the CVOA than do catcher/processors, and the offshore sector in general. It should be noted that according to industry sources shore based catcher vessels are ranging up to 200 miles during pollock trips. Although this somewhat contradicts the data found in ADF&G fish tickets, those data are known to have serious problems with accuracy, especially as used in this analysis.

4.3.10.6 Catcher Vessel Limitations and Processing Constraints

Pollock needs to be processed soon after it is caught. According to industry sources this maximum period may be as short as 30 hours or as long as 3 days. Catcher vessels delivering to shoreside plant are clearly limited by this factor and by their vessel running speed. If profitability is considered, it is clearly more profitable to fish closer to the point of delivery than farther if CPUEs are the same. By the same token it may be more profitable for catcher/processors to operate near ports to save time and money in reprovisioning, however catcher/processors were constructed to fish far from port so this may be less of a factor.

At-sea delivery vessels are less limited than shorebased vessels, but must be able to fish within 2 miles of the their processor. Therefore the CVOA as implemented in 1992 which does not allow motherships to process within the zone, in effect denies at-sea catcher vessels access.

4.3.10.7 Ice and Weather Conditions

To the extent that the implementation of the CVOA shifts fishing activity into areas where ice and weather conditions are worse, the CVOA will negatively impact the those operations. Offshore mothership operations appear to be the most at risk due to the need of their catcher vessels to be able to run for shelter during inclement weather, and the fact that these operations would be excluded from the CVOA.

4.3.10.8 Gear Conflicts

Increased gear conflicts appear likely if implementation of the CVOA shift pollock operations into areas used heavily by the crab fleet during the late fall and winter.

4.3.10.9 Marine Mammals

Much of the potential for Stellar Sea Lion conflicts as a result of the CVOA appear to have been nullified with regulation set forth in Amendment 20 to the BSAI Fishery Management Plan. If, however, the implementation of the CVOA put additional fishing effort in area previously less used, then other seabird and marine mammals population may experience additional stress. NMFS Scientists in a Section 7 consultation with regard to the inshore/offshore proposal made a finding of no significant impact on marine mammals and seabirds in February of 1992.

4.4 Effects of the CVOA on the Outcomes in the Cost/Benefit Analysis

The quantitative dollar effects of designating a CVOA are difficult to ascertain, given the conjectural nature of the impacts on catching and processing operations. Moreover, certain issues such as impacts on the marine environment, discards, and bycatch preclude definitive dollar valuation given the data available. It is impossible, however, to assess directional changes on the inshore and offshore sectors that could result from implementation of the CVOA, and qualitatively interpret the possible impacts on costs and benefits.

4.4.1 Costs and Benefits of CVOA to Catcher/Processors

Higher cost for fuel: Additional costs could result if catcher/processors have to run further to fishing grounds. However this cost is likely to be incremental because catcher/processors make generally less than 10 runs to and from an in-season port such as Dutch Harbor. Since the majority of fishing effort by catcher processors in the last three years has been outside the CVOA, few of these runs would be affected. Additionally, although fuel expenses are a very significant portion of operating cost, most of this occurs in daily operations rather than in running to and from port.

Fish Finding Costs: If catcher/processors are forced into new areas they may not know where fish aggregations are located. However, the incremental increase in costs may be small because aggregations of pollock are notoriously dynamic, and fish finding costs occur regardless of where one is fishing.

Length of Fish: Smaller fish are more expensive to process because filleting machines are constrained by the number of fish they can handle per unit of time. It appears that fish are generally smaller outside than inside the CVOA, however only incrementally so. Additionally, since catcher/processors have spent relatively less time inside than outside the CVOA these costs will appear small when compared to the cost of processing significantly smaller amounts of pollock overall.

Greater Variance in the Length of Fish: The more variance in the size of fish the less the product recovery rate in general. This occurs because filleting machines are set for an average fish size; the more variance around the mean, the less consistent the fillets will be.

Higher CPUEs outside CVOA: If the offshore sector experiences higher CPUEs outside the CVOA than inside, then fishing cost could drop. This possible benefit, however, is probably minor when compared with the higher costs associated with processing fewer fish due to a reduced allocation.

Summary of cost/benefits for the catcher/processors: Since the majority of fishing effort for the offshore sector already takes place outside the CVOA one can assume it is more profitable for those vessels to operate there. Otherwise they would operate at a higher rate inside the CVOA. Some individual vessels probably find it more profitable to operate inside the CVOA. Those vessels will likely experience higher costs. Overall, there are several factors which suggest that catcher-processor costs will increase incrementally due to the designation of a CVOA. On balance, the net economic impacts may be relatively small however, especially in comparison to the aggregate net losses due to a reduced allocation, as estimated in the cost benefit analysis.

4.4.2 Costs and Benefit of the CVOA on Mothership Operations

Costs or benefits incurred by mothership operations due to the imposition of a CVOA depends on whether they are allowed to operate inside the CVOA. If mothership operations are not allowed to operate inside the CVOA, they will experience the same cost/benefits outlined for the catcher/processors, perhaps to a greater degree because of mothership's greater relative dependence over time on the CVOA. Additionally, vessels delivering to motherships will experience higher costs due to increased running time to and from ports. If motherships operations are allowed to operate inside the CVOA than none of the costs accruing to the catcher/processor sector because of the CVOA are likely to occur.

4.4.3 Cost and Benefits of the CVOA to Inshore Sector

The CVOA will benefit most vessels delivering to inshore plants based inside the CVOA. Vessels delivering to plants outside the CVOA will not likely accrue any benefits. Inshore delivery vessels will likely experience reduced fuel costs, because presumably all trips would occur inside rather than outside the CVOA. However, these smaller costs are viewed to be incremental because very few inshore delivery vessels made trips outside the CVOA. Additionally, any benefits due to the longer size of fish or smaller variability within the CVOA will also be insignificant because virtually all of this sector's pollock has come form the CVOA.

4.5 Summary of the Effects of the CVOA on Industry Sectors

The effects of the CVOA are different depending on which sector of the industry is examined. There are five relevant sectors; (1) offshore catcher/processors, (2) offshore mothership operations, (3) inshore mothership operations, (4) shore based processing plants, and (5) shore based catcher vessels. The effects of the CVOA on each of these sectors may be further categorized as follows; (1) effects of implementing a CVOA regardless of the allocation, (2) effects of implementing the CVOA that depend on the size of the allocation, and (3) effect of not implementing the CVOA if there is an allocation. The likely impacts on each identified sector will be examined in light of these three considerations.

4.5.1 Offshore Catcher/Processors

Under the CVOA, offshore catcher/processors will be not be allowed to fish in an area in which they have in the past. The extent of the offshore sector's reliance on the CVOA is different depending on the criteria chosen; catch, profitability, operational safety, convenience, etc. Regardless, the CVOA will mean a change in the way these vessels operate. Perhaps the most damaging effect is the loss of the option to fish the CVOA if it is profitable (the option value). If the CVOA is implemented and the offshore catcher/processors move, for example, off the Pribilofs, displacing harvest efforts of a Pribilof-based fleet, then the preemption issue could rise again, requiring perhaps a "Pribilovian Vessel Operation Area".

It can be reasoned that the greater the allocation to the inshore sector, the less the effect of the CVOA on the offshore sector. For example, if the allocation were such that the offshore sector were allocated an amount equal to the amount they harvested outside the CVOA, then the offshore sector could simply forego their activities in the CVOA and be relatively no worse off had the CVOA not been implemented. From this point of view, every ton allocated above that amount harvested outside the CVOA will increase any cost resulting from the offshore sector's inability to use the zone.

Conversely, the greater the allocation to the offshore sector, the less the net loss (as estimated in the cost-benefit analysis). If the implementation of a CVOA imposes additional costs on the offshore sector, then the more they are allowed to harvest outside the CVOA, the more they will be able to offset the additional costs.

In the absence of a CVOA, the offshore catcher/processors are given the latitude to operate in which ever area is most conducive to their individual objectives, and this would be expected to enhance efficiency.

If the CVOA were not implemented, regardless of the allocation, the offshore sector would likely face continued allegations of preempting shore based operations in the area. These political costs may be offset by reduced operating expenses, if they exist, from operating within the CVOA.

4.5.2 Offshore Mothership Operations

Offshore mothership operations will also be affected by the implementation of the CVOA, but much of the effect will depend on the extent to which motherships are allowed to operate inside the CVOA. For simplicity, the analysis will assume that the regulation of a future CVOA will prohibit motherships from operating in the CVOA, as is the case in the 1992 regulations.

If the CVOA excludes mothership from processing within the CVOA, this eliminates at-sea delivery vessel from using the CVOA, which appears contrary to the designation of a catcher vessel operational area. The CVOA has been important to offshore mothership operations, accounting for an estimated 74% of their catch. Displaced from the CVOA, these operations will likely move into other areas, with possible increased economic and social costs.

It has been suggested that offshore mothership operations will simply move into the inshore sector by anchoring up within the baseline. For operations which depend on former JV catcher vessels this may be impossible due to the lack of RSW hold space.

4.5.3 Inshore Mothership Operations

Inshore mothership operations will be presumably benefit from the CVOA, to the extent that the catcher vessel for these operations utilize the operational zone, and these operations would receive protection from the competitive threat posed by the offshore fleet. In 1991, approximately 94% of inshore mothership pollock deliveries came from within the CVOA. Inshore mothership operation which may choose to locate in areas outside the CVOA, in the St. Matthews Islands or Atka for example, may be negatively impacted if the offshore sector increases their operations in those vicinities because of implementation of the CVOA.

Other effects of the CVOA on inshore mothership operations will be similar to those experience by the shore based processing plants in section 4.4.1.5 which follows.

4.5.4 Shore Based Catcher Vessels

The effects of the CVOA on shored based catcher vessels are likely to be positive. Gone is the threat, perceived or real, that the offshore sector will harvest all available pollock near the shore based plants, then move on to other aggregations of pollock. Gone also is the possibility of large catcher/processors and smaller catcher vessels competing for space to trawl. Also eliminated from the area are at-sea delivery vessels which also compete for fishing grounds. It should be noted that shore based catcher vessels are not limited to fish within the CVOA, and therefore will not be forced to change their behavior in any foreseeable manner.

If the implementation of the CVOA is accompanied by an allocation to the inshore sector, then it is likely that the entire inshore harvest could come from within the CVOA, given reduced competition from the offshore fleet. This would mean lower costs for these harvesting vessels, and, possibly higher profits. If the CVOA were implemented, even in the absence of an inshore/offshore split of the pollock TAC, the operational zone would benefit shore based catcher vessels, virtually guaranteeing them access to a sufficiently large biomass of pollock from which to harvest.

If the inshore/offshore allocation went forward without the CVOA, it is likely that the shore based catcher fleet would continue to operate as they have in the past, along the technology path which has enabled shore based catcher vessels to fish farther from their plants, with increased catch capacity. This process is not without costs: private costs accruing to the vessel owner who must continue to invest to keep up with the changing nature of the fishery, and social costs incurred by the Nation as a whole as it continues to invest capital into fisheries wherein sufficient harvest capacity already exists. [NPFMC, 1992b]

4.5.5 Shore Based Processing Plants

Shore based processing plants, which are currently all located adjacent to the CVOA, will most likely benefit from the implementation of the operational zone. These processors are highly dependent on pollock caught from within the zone. The CVOA will eliminate the threat, whether perceived or real, that the offshore sector will harvest the nearby pollock aggregations then move on to other areas. This would hold whether or not there were a specific allocation to the inshore sector.

If the implementation of the CVOA is accompanied by an allocation to the inshore sector, then it is likely that the entire inshore allocation could come from within the CVOA. Because catcher vessels delivering to shore based plants might incur lower harvesting costs, it is possible that shore based processors might negotiate lower ex-vessel purchase prices, thereby cutting there own costs as well.

If there were an inshore allocation without the CVOA, there is the possibility that the inshore sector would not be able to harvest their entire allocation without extra costs incurred because vessel must range farther to find available pollock. To the extent that catcher vessels are willing to incur any additional costs and still provide raw product to the shore based processors, then there may be no extra costs to these processors, unless they have to increase ex-vessel prices in order to entice vessels to deliver fish.

If the CVOA were implemented even without an inshore/offshore allocation, the operational zone would still benefit shore based processors. Given that offshore catcher/processors would no longer be able to fish in the CVOA, the inshore harvesting sector, could presumably deliver as much pollock to shore based processors as needed, before the entire TAC was taken if the processors offered high enough ex-vessel prices. Of course this indicates an increase in the "race for fish," which will continue to be the case, until a rational system for managing the fisheries is implemented.

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CHAPTER 4

APPENDICES

APPENDIX 4A

List of Tables

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Table 1. CPUE statistics for the domestic pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
89	1	Observations	[illegible]	[illegible]	4.0	3.0
		Observed Tons	[illegible]	[illegible]	3,277.4	1,155.0
		Mean CPUE (mt/hr)	[illegible]	[illegible]	25.2	38.3
		Variance	[illegible]	[illegible]	60.0	76.1
		Weighting Factor	[illegible]	[illegible]	0.1	0.1
	2	Observations	7.0	8.0	6.0	38.0
		Observed Tons	1,871.9	2,342.6	2,730.6	21,944.0
		Mean CPUE (mt/hr)	12.7	11.8	22.2	12.8
		Variance	2.2	1.3	5.8	0.5
		Weighting Factor	0.7	0.9	0.4	1.4
	3	Observations	9.0	12.0	16.0	24.0
		Observed Tons	936.5	2,517.0	9,193.6	19,202.0
		Mean CPUE (mt/hr)	7.2	9.0	13.0	24.1
		Variance	0.6	3.5	2.7	1.9
		Weighting Factor	1.3	0.5	0.6	0.7
	4	Observations	14.0	13.0	13.0	8.0
		Observed Tons	5,765.1	1,621.4	21,027.4	4,539.3
		Mean CPUE (mt/hr)	7.1	9.5	11.4	12.5
		Variance	0.4	4.0	1.3	3.4
		Weighting Factor	1.7	0.5	0.9	0.5
90	1	Observations	18.0	10.0	25.0	16.0
		Observed Tons	13,637.4	8,126.4	48,138.3	51,700.3
		Mean CPUE (mt/hr)	13.3	30.6	33.5	41.4
		Variance	6.0	3.3	17.1	5.0
		Weighting Factor	0.4	0.6	0.2	0.4
	2	Observations	15.0	33.0	16.0	58.0
		Observed Tons	10,636.8	19,677.3	31,179.8	210,339.5
		Mean CPUE (mt/hr)	10.6	15.2	12.8	20.4
		Variance	3.2	0.8	1.0	0.6
		Weighting Factor	0.6	1.1	1.0	1.3
	3	Observations	14.0	44.0	14.0	77.0
		Observed Tons	9,655.9	32,588.3	66,879.7	247,470.2
		Mean CPUE (mt/hr)	10.4	17.4	10.5	19.6
		Variance	1.5	0.6	1.1	0.5
		Weighting Factor	0.8	1.3	0.9	1.5
	4	Observations	7.0	18.0	1.0	30.0
		Observed Tons	1,987.5	5,587.2	802.0	84,010.7
		Mean CPUE (mt/hr)	3.9	11.7	11.6	11.3
		Variance	0.3	2.7	0.0	0.4
		Weighting Factor	1.8	0.6	0.0	1.7

Table 2. Results of weighted regression analyses of log(CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_i), and interactions for domestic fisheries.

		Predictor	Coef	Stdev	t-ratio	p
Pollock (Bottom)	1989	Constant	2.2077	0.2378	9.28	0.000
		I/O	-0.4033	0.2687	-1.50	0.139
		Q2	0.2382	0.3302	0.72	0.474
		Q3	-0.1043	0.3379	-0.31	0.759
		I/O * Q2	0.4592	0.4494	1.02	0.311
		I/O * Q3	0.1872	0.4002	0.47	0.642
	1990	Constant	2.0844	0.1594	13.08	0.000
		I/O	-0.9731	0.2192	-4.44	0.000
		Q1	1.3348	0.2757	4.84	0.000
		Q2	0.4686	0.1812	2.59	0.011
		Q3	0.5416	0.1740	3.11	0.002
		I/O * Q1	-0.1548	0.3699	-0.42	0.676
		I/O * Q2	0.5875	0.2983	1.97	0.051
		I/O * Q3	0.4449	0.2783	1.60	0.112
Pollock (Midwater)	1989	Constant	2.6638	0.2111	12.62	0.000
		I/O	-0.2470	0.2483	-0.99	0.322
		Q1	1.1321	0.7797	1.45	0.150
		Q2	-0.0973	0.2194	-0.44	0.658
		Q3	0.4388	0.2362	1.86	0.066
		I/O * Q1	-0.195	1.000	-0.19	0.846
		I/O * Q2	0.6474	0.3783	1.71	0.090
		I/O * Q3	-0.4551	0.3048	-1.49	0.138
	1990	Constant	2.86234	0.03614	79.20	0.000
		I/O	-0.6783	0.1125	-6.03	0.000
		Q1	0.7967	0.1489	5.35	0.000
		Q2	0.11518	0.05787	1.99	0.048
		I/O * Q1	0.3406	0.2412	1.41	0.159
		I/O * Q2	0.3258	0.1553	2.10	0.037

Table 3. CPUE statistics for the joint venture pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
84	1	Observations	[illegible]	0.0	4.0	0.0
		Observed Tons	[illegible]	0.0	24,898.3	0.0
		Mean CPUE (mt/hr)	[illegible]	0.0	147.4	0.0
		Variance	[illegible]	0.0	208.7	0.0
		Weighting Factor	[illegible]	0.0	0.1	0.0
	2	Observations	7.0	4.0	16.0	6.0
		Observed Tons	9,390.5	1,303.6	53,809.1	4,184.2
		Mean CPUE (mt/hr)	83.0	39.2	63.6	67.8
		Variance	90.0	364.3	28.0	144.0
		Weighting Factor	0.1	0.1	0.2	0.1
	3	Observations	13.0	8.0	24.0	31.0
		Observed Tons	3,030.9	1,171.4	67,266.5	49,918.1
		Mean CPUE (mt/hr)	23.1	24.3	32.7	53.2
		Variance	20.6	18.2	4.6	30.3
		Weighting Factor	0.2	0.2	0.5	0.2
	4	Observations	1.0	0.0	1.0	0.0
		Observed Tons	140.0	0.0	215.8	0.0
		Mean CPUE (mt/hr)	11.8	0.0	62.3	0.0
		Variance	0.0	0.0	0.0	0.0
		Weighting Factor	0.0	0.0	0.0	0.0
85	1	Observations	1.0	0.0	0.0	0.0
		Observed Tons	450.7	0.0	0.0	0.0
		Mean CPUE (mt/hr)	16.3	0.0	0.0	0.0
		Variance	0.0	0.0	0.0	0.0
		Weighting Factor	0.0	0.0	0.0	0.0
	2	Observations	11.0	2.0	5.0	2.0
		Observed Tons	6,581.1	302.1	4,525.4	1,128.8
		Mean CPUE (mt/hr)	7.4	4.8	12.7	6.5
		Variance	1.1	0.0	1.4	0.0
		Weighting Factor	1.0	0.0	0.8	0.0
	3	Observations	10.0	8.0	2.0	1.0
		Observed Tons	2,492.6	2,390.6	2,712.8	2,169.0
		Mean CPUE (mt/hr)	4.7	6.0	10.5	12.0
		Variance	0.2	0.6	0.0	0.0
		Weighting Factor	2.3	1.3	0.0	0.0
	4	Observations	5.0	1.0	1.0	0.0
		Observed Tons	931.6	119.8	161.8	0.0
		Mean CPUE (mt/hr)	5.9	5.2	6.9	0.0
		Variance	0.3	0.0	0.0	0.0
		Weighting Factor	1.7	0.0	0.0	0.0

Table 3. Continued.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
86	1	Observations	[illegible]	3.0	1.0	0.0
		Observed Tons	[illegible]	84.2	18,235.6	0.0
		Mean CPUE (mt/hr)	13.3	4.5	21.0	0.0
		Variance	2.1	0.0	0.0	0.0
		Weighting Factor	0.7	0.0	0.0	0.0
	2	Observations	9.0	1.0	3.0	0.0
		Observed Tons	12,031.6	1,143.4	6,430.9	0.0
		Mean CPUE (mt/hr)	8.3	5.5	11.1	0.0
		Variance	0.3	0.0	0.8	0.0
		Weighting Factor	1.6	0.0	1.1	0.0
	3	Observations	12.0	9.0	8.0	3.0
		Observed Tons	13,984.4	9,165.1	6,386.9	19,467.4
		Mean CPUE (mt/hr)	7.2	6.2	8.5	11.7
		Variance	0.3	0.1	0.6	0.1
		Weighting Factor	1.9	3.3	1.3	4.2
	4	Observations	14.0	4.0	10.0	0.0
		Observed Tons	23,460.2	642.4	9,758.6	0.0
		Mean CPUE (mt/hr)	6.1	4.1	9.0	0.0
		Variance	0.1	0.1	0.7	0.0
		Weighting Factor	3.1	3.3	1.2	0.0
87	1	Observations	16.0	6.0	26.0	21.0
		Observed Tons	9,557.3	12,860.6	124,685.5	49,325.2
		Mean CPUE (mt/hr)	10.9	13.4	34.7	19.2
		Variance	0.3	0.9	32.7	11.0
		Weighting Factor	1.8	1.1	0.2	0.3
	2	Observations	12.0	49.0	6.0	60.0
		Observed Tons	10,122.5	22,974.7	3,453.9	145,821.3
		Mean CPUE (mt/hr)	8.8	8.8	13.3	10.9
		Variance	0.7	0.4	5.4	0.3
		Weighting Factor	1.2	1.5	0.4	1.8
	3	Observations	4.0	18.0	2.0	12.0
		Observed Tons	1,198.2	16,459.5	425.4	6,247.8
		Mean CPUE (mt/hr)	5.4	7.5	6.2	11.5
		Variance	0.3	0.1	0.0	1.3
		Weighting Factor	1.9	2.6	0.0	0.9
	4	Observations	1.0	8.0	0.0	3.0
		Observed Tons	26.0	3,350.1	0.0	1,112.5
		Mean CPUE (mt/hr)	2.4	7.9	0.0	10.7
		Variance	0.0	0.4	0.0	0.6
		Weighting Factor	0.0	1.6	0.0	1.3

Continued

Table 3. Concluded.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
88	1	Observations	15.0	12.0	17.0	8.0
		Observed Tons	17,066.1	5,026.7	73,202.7	14,885.7
		Mean CPUE (mt/hr)	17.6	13.2	25.5	20.3
		Variance	2.1	0.9	3.6	16.6
		Weighting Factor	0.7	1.0	0.5	0.2
	2	Observations	12.0	24.0	6.0	46.[illegible]
		Observed Tons	13,865.0	8,126.9	3,297.7	129,647.6
		Mean CPUE (mt/hr)	10.4	9.3	12.0	13.7
		Variance	1.5	1.5	5.1	0.4
		Weighting Factor	0.8	0.8	0.4	1.7
	3	Observations	6.0	6.0	3.0	1.0
		Observed Tons	2,430.2	5,556.8	1,916.0	89.7
		Mean CPUE (mt/hr)	10.2	9.5	7.5	9.7
		Variance	2.7	0.4	2.4	0.0
		Weighting Factor	0.6	1.7	0.6	0.0
	4	Observations	1.0	4.0	12.0	3.0
		Observed Tons	125.8	1,460.2	14,255.2	898.1
		Mean CPUE (mt/hr)	4.5	8.0	9.8	14.[illegible]
		Variance	0.0	2.4	0.2	42.2
		Weighting Factor	0.0	0.8	2.4	0.2

Table 4. Results of weighted regression analyses of log(CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_i), and interactions for joint venture fisheries.

		Predictor	Coef	Stdev	t-ratio	p
Pollock (Bottom)	1984	Constant	3.0782	0.2338	13.17	0.000
		I/O	-0.0869	0.3007	-0.29	0.775
		Q2	0.5293	0.7377	0.72	0.479
		I/O * Q2	0.5420	0.8479	0.64	0.528
	1985	Predictor	Coef	Stdev	t-ratio	
		Constant	1.7576	0.2656	6.62	0.000
		I/O	-0.3500	0.3193	-1.10	0.289
	1986	Predictor	Coef	Stdev	t-ratio	p
		Constant	1.44945	0.08616	16.82	0.000
		I/O	0.37545	0.09841	3.82	0.001
		Q3	0.4409	0.1038	4.25	0.000
		I/O * Q3	-0.3818	0.1318	-2.90	0.006
	1987	Predictor	Coef	Stdev	t-ratio	p
		Constant	1.72757	0.08704	19.85	0.000
		I/O	0.0451	0.2334	0.19	0.847
		Q1	0.4332	0.2499	1.73	0.086
		Q2	0.2489	0.1110	2.24	0.027
		I/O * Q1	0.1334	0.3485	0.38	0.703
		I/O * Q2	0.0994	0.2894	0.34	0.732
	1988	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.2673	0.1383	16.39	0.000
		I/O	0.0386	0.2689	0.14	0.886
		Q1	0.2937	0.1861	1.58	0.119
		Q2	-0.0110	0.1707	-0.06	0.949
		I/O * Q1	0.0746	0.3262	0.23	0.820
		I/O * Q2	-0.0133	0.3196	-0.04	0.967
Pollock (Midwater)	1984	Predictor	Coef	Stdev	t-ratio	p
		Constant	3.8898	0.1142	34.06	0.000
		I/O	-0.5285	0.1400	-3.78	0.000
		Q2	-0.1283	0.3999	-0.32	0.749
		I/O * Q2	0.9084	0.4368	2.08	0.041
	1986	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.2513	0.1929	11.67	0.000
		I/O	0.0140	0.2864	0.05	0.962

Continued

Table 4. Concluded.

		Predictor	Coef	Stdev	t-ratio	p
Pollock (Midwater)	1987	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.34778	0.04134	56.80	0.000
		I/O	0.0206	0.2696	0.08	0.939
		Q1	0.6048	0.1751	3.45	0.001
		I/O * Q1	0.1015	0.3769	0.27	0.788
	1988	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.8705	0.6908	4.16	0.000
		I/O	-0.5504	0.6963	-0.79	0.431
		Q1	0.2184	0.7676	0.28	0.777
		Q2	-0.2944	0.6928	-0.42	0.672
		I/O * Q1	0.8655	0.7884	1.10	0.275
		I/O * Q2	0.3795	0.7552	0.50	0.617

Table 5. CPUE statistics for the foreign pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
81	1	Observations	0.0	[illegible]	0.0	30.0
		Observed Tons	0.0	[illegible]	0.0	10,312.3
		Mean CPUE (mt/hr)	0.0	[illegible]	0.0	7.6
		Variance	0.0	0.2	0.0	1.2
		Weighting Factor	0.0	2.3	0.0	0.9
	2	Observations	3.0	16.0	3.0	33.0
		Observed Tons	1,299.6	3,089.2	2,837.1	6,979.3
		Mean CPUE (mt/hr)	4.6	3.9	4.7	3.7
		Variance	0.0	0.1	0.4	0.2
		Weighting Factor	10.1	3.2	1.7	2.3
	3	Observations	6.0	10.0	16.0	16.0
		Observed Tons	643.7	377.5	10,492.0	2,651.0
		Mean CPUE (mt/hr)	4.9	2.0	7.4	8.3
		Variance	0.3	0.5	0.2	0.4
		Weighting Factor	1.8	1.4	2.3	1.6
	4	Observations	8.0	16.0	8.0	16.0
		Observed Tons	1,369.6	940.3	10,182.7	2,196.6
		Mean CPUE (mt/hr)	4.9	3.3	8.7	8.9
		Variance	0.4	0.7	0.1	1.1
		Weighting Factor	1.7	1.2	4.1	1.0
82	1	Observations	0.0	3.0	0.0	38.0
		Observed Tons	0.0	133.4	0.0	15,892.0
		Mean CPUE (mt/hr)	0.0	4.7	0.0	8.6
		Variance	0.0	6.4	0.0	0.2
		Weighting Factor	0.0	0.4	0.0	2.1
	2	Observations	1.0	21.0	0.0	18.0
		Observed Tons	405.2	6,393.1	0.0	5,200.4
		Mean CPUE (mt/hr)	4.5	4.5	0.0	7.1
		Variance	0.0	0.1	0.0	0.5
		Weighting Factor	0.0	3.3	0.0	1.4
	3	Observations	14.0	34.0	19.0	42.0
		Observed Tons	11,900.3	3,511.3	26,759.6	15,076.8
		Mean CPUE (mt/hr)	7.7	4.1	9.5	8.2
		Variance	1.0	0.7	0.3	0.4
		Weighting Factor	1.0	1.2	1.8	1.6
	4	Observations	7.0	24.0	7.0	31.0
		Observed Tons	4,259.7	1,826.9	15,478.7	21,557.9
		Mean CPUE (mt/hr)	5.9	3.7	8.9	12.2
		Variance	0.2	0.4	0.1	0.3
		Weighting Factor	2.1	1.7	2.7	1.8

Table 5. Continued.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
83	1	Observations	0.0	55.0	0.0	55.0
		Observed Tons	0.0	[illegible]	0.0	30,146.9
		Mean CPUE (mt/hr)	0.0	2.5	0.0	9.2
		Variance	0.0	0.2	0.0	1.7
		Weighting Factor	0.0	2.1	0.0	0.8
	2	Observations	4.0	40.0	5.0	25.0
		Observed Tons	678.0	9,921.7	4,622.8	9,839.7
		Mean CPUE (mt/hr)	5.4	5.3	11.3	7.9
		Variance	0.7	0.1	1.0	0.7
		Weighting Factor	1.2	2.7	1.0	1.2
	3	Observations	7.0	32.0	14.0	58.0
		Observed Tons	7,130.3	3,264.0	23,507.7	34,230.7
		Mean CPUE (mt/hr)	8.1	5.3	11.1	10.7
		Variance	0.4	0.5	1.1	0.2
		Weighting Factor	1.5	1.5	1.0	2.6
	4	Observations	6.0	33.0	9.0	20.0
		Observed Tons	11,155.6	5,995.3	29,285.1	10,652.2
		Mean CPUE (mt/hr)	8.1	4.5	8.6	11.5
		Variance	0.1	0.5	0.0	0.7
		Weighting Factor	3.2	1.4	5.0	1.2
84	1	Observations	0.0	5.0	0.0	85.0
		Observed Tons	0.0	523.4	0.0	57,825.8
		Mean CPUE (mt/hr)	0.0	5.6	0.0	7.1
		Variance	0.0	4.0	0.0	0.4
		Weighting Factor	0.0	0.5	0.0	1.6
	2	Observations	3.0	18.0	1.0	20.0
		Observed Tons	504.2	1,968.3	45.1	8,965.4
		Mean CPUE (mt/hr)	6.8	3.9	3.1	7.1
		Variance	0.5	0.2	0.0	0.7
		Weighting Factor	1.4	2.1	0.0	1.2
	3	Observations	3.0	44.0	11.0	64.0
		Observed Tons	1,057.2	7,813.2	7,317.8	31,859.7
		Mean CPUE (mt/hr)	8.2	7.0	8.3	12.7
		Variance	1.9	0.6	0.2	0.5
		Weighting Factor	0.7	1.3	2.0	1.4
	4	Observations	8.0	20.0	8.0	67.0
		Observed Tons	9,603.6	5,923.4	27,207.0	67,272.2
		Mean CPUE (mt/hr)	7.6	6.7	7.2	10.0
		Variance	0.3	0.2	0.2	0.5
		Weighting Factor	1.7	2.0	2.2	1.4

Continued

Table 5. Concluded.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
85	1	Observations	[illegible]	[illegible]	0.0	51.0
		Observed Tons	0.0	[illegible]	0.0	32,816.5
		Mean CPUE (mt/hr)	0.0	[illegible]	0.0	9.6
		Variance	0.0	0.0	0.0	1.5
		Weighting Factor	0.0	0.0	0.0	0.8
	2	Observations	0.0	10.0	0.0	15.0
		Observed Tons	0.0	3,694.3	0.0	10,643.4
		Mean CPUE (mt/hr)	0.0	5.2	0.0	7.4
		Variance	0.0	0.4	0.0	2.4
		Weighting Factor	0.0	1.6	0.0	0.8
	3	Observations	2.0	33.0	2.0	69.0
		Observed Tons	552.8	28,015.1	284.1	40,685.3
		Mean CPUE (mt/hr)	7.5	9.9	11.9	13.6
		Variance	0.0	0.3	0.0	0.3
		Weighting Factor	0.0	1.7	0.0	1.9
	4	Observations	6.0	65.0	11.0	66.0
		Observed Tons	9,440.5	18,873.6	55,033.4	64,405.7
		Mean CPUE (mt/hr)	7.1	5.9	11.8	11.7
		Variance	0.3	0.2	0.5	1.0
		Weighting Factor	1.9	2.5	1.4	1.0
86	1	Observations	0.0	2.0	0.0	13.0
		Observed Tons	0.0	276.9	0.0	5,719.7
		Mean CPUE (mt/hr)	0.0	19.4	0.0	15.2
		Variance	0.0	0.0	0.0	3.7
		Weighting Factor	0.0	0.0	0.0	0.5
	2	Observations	0.0	7.0	0.0	10.0
		Observed Tons	0.0	4,217.4	0.0	11,114.9
		Mean CPUE (mt/hr)	0.0	5.5	0.0	5.4
		Variance	0.0	0.2	0.0	0.2
		Weighting Factor	0.0	2.2	0.0	2.2
	3	Observations	5.0	25.0	8.0	27.0
		Observed Tons	1,701.7	10,772.6	3,952.9	13,867.7
		Mean CPUE (mt/hr)	9.2	10.0	9.7	18.1
		Variance	0.4	0.6	0.5	1.3
		Weighting Factor	1.6	1.3	1.4	0.9
	4	Observations	7.0	14.0	5.0	23.0
		Observed Tons	3,501.7	1,645.9	9,408.2	9,878.3
		Mean CPUE (mt/hr)	10.6	6.8	13.1	9.9
		Variance	0.7	1.6	0.3	3.3
		Weighting Factor	1.2	0.8	1.8	0.5

Table 6. **Results of weighted regression analyses of log(CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_i), and interactions for foreign fisheries.**

Species	Year	Predictor	Coef	Stdev	t-ratio	p
Pollock (Bottom)	1981	Constant	0.7745	0.1988	3.90	0.000
		I/O	0.7252	0.3126	2.32	0.024
		Q2	0.4374	0.2334	1.87	0.066
		Q3	-0.1289	0.3062	-0.42	0.676
		I/O * Q2	-0.4744	0.3719	-1.28	0.208
		I/O * Q3	-0.0358	0.4740	-0.08	0.940
	1982	Constant	1.1559	0.1943	5.95	0.000
		I/O	0.4522	0.3735	1.21	0.230
		Q3	-0.2798	0.2756	-1.02	0.313
		I/O * Q3	0.3864	0.5340	0.72	0.472
	1983	Constant	0.9213	0.1503	6.13	0.000
		I/O	1.0111	0.2788	3.63	0.000
		Q2	0.4745	0.1800	2.64	0.010
		Q3	0.3602	0.2129	1.69	0.093
		I/O * Q2	-0.9083	0.5620	-1.62	0.109
		I/O * Q3	-0.4746	0.4470	-1.06	0.291
	1984	Constant	1.6787	0.1168	14.37	0.000
		I/O	0.2763	0.2325	1.19	0.238
		Q2	-0.3882	0.1671	-2.32	0.022
		Q3	-0.0487	0.1530	-0.32	0.751
		I/O * Q2	0.3859	0.4510	0.86	0.394
		I/O * Q3	0.1793	0.5635	0.32	0.751
	1985	Constant	1.56536	0.06559	23.87	0.000
		I/O	0.0096	0.2540	0.04	0.970
	1986	Constant	1.7378	0.1825	9.52	0.000
		I/O	0.3762	0.2768	1.36	0.181
		Q3	0.4128	0.2109	1.96	0.056
		I/O * Q3	-0.4311	0.3673	-1.17	0.246

Continued

Table 6. Concluded.

		Predictor	Coef	Stdev	t-ratio	p
Pollock (Midwater)	1981	Constant	2.0533	0.2027	10.13	0.000
		I/O	0.1221	0.2455	0.50	0.620
		Q2	-0.6526	0.2223	-2.94	0.004
		Q3	0.0963	0.2559	0.38	0.708
		I/O * Q2	-0.0698	0.4420	-0.16	0.875
		I/O * Q3	-0.2114	0.3193	-0.66	0.510

	Predictor	Coef	Stdev	t-ratio	
1982	Constant	2.5129	0.1162	21.62	0.000
	I/O	-0.2262	0.2290	-0.99	0.326
	Q3	-0.4919	0.1578	-3.12	0.002
	I/O * Q3	0.4364	0.2926	1.49	0.139

	Predictor	Coef	Stdev	t-ratio	p
1983	Constant	2.5472	0.1267	20.10	0.000
	I/O	-0.2783	0.1567	-1.78	0.078
	Q2	-0.6086	0.1700	-3.58	0.000
	Q3	-0.1693	0.1365	-1.24	0.217
	I/O * Q2	0.5421	0.3397	1.60	0.113
	I/O * Q3	0.1557	0.2360	0.66	0.511

	Predictor	Coef	Stdev	t-ratio	p
1984	Constant	2.32839	0.04779	48.72	0.000
	I/O	-0.1897	0.1196	-1.59	0.115
	Q3	0.19440	0.06787	2.86	0.005
	I/O * Q3	-0.2072	0.1623	-1.28	0.204

	Predictor	Coef	Stdev	t-ratio	p
1985	Constant	2.39392	0.06429	37.24	0.000
	I/O	-0.1958	0.1475	-1.33	0.188

	Predictor	Coef	Stdev	t-ratio	p
1986	Constant	2.3141	0.1201	19.26	0.000
	I/O	0.1511	0.1875	0.81	0.424
	Q3	0.5538	0.1491	3.71	0.000
	I/O * Q3	-0.7397	0.2425	-3.05	0.003

Table 7. Pollock CPUE statistics for the domestic pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
89	1	Observations	[illegible]	0.0	N/A	N/A
		Observed Tons	958.4	0.0	N/A	N/A
		Mean CPUE (mt/hr)	12.5	0.0	N/A	N/A
		Variance	18.1	0.0	N/A	N/A
		Weighting Factor	0.2	0.0	N/A	N/A
	2	Observations	7.0	8.0	N/A	N/A
		Observed Tons	1,562.6	2,069.5	N/A	N/A
		Mean CPUE (mt/hr)	10.6	10.4	N/A	N/A
		Variance	2.6	1.5	N/A	N/A
		Weighting Factor	0.6	0.8	N/A	N/A
	3	Observations	9.0	12.0	N/A	N/A
		Observed Tons	740.3	2,187.9	N/A	N/A
		Mean CPUE (mt/hr)	5.7	7.9	N/A	N/A
		Variance	0.9	3.5	N/A	N/A
		Weighting Factor	1.1	0.5	N/A	N/A
	4	Observations	14.0	13.0	N/A	N/A
		Observed Tons	4,794.0	1,358.6	N/A	N/A
		Mean CPUE (mt/hr)	5.9	7.9	N/A	N/A
		Variance	0.7	3.6	N/A	N/A
		Weighting Factor	1.2	0.5	N/A	N/A
90	1	Observations	N/A	N/A	N/A	N/A
		Observed Tons	N/A	N/A	N/A	N/A
		Mean CPUE (mt/hr)	N/A	N/A	N/A	N/A
		Variance	N/A	N/A	N/A	N/A
		Weighting Factor	N/A	N/A	N/A	N/A
	2	Observations	N/A	N/A	N/A	N/A
		Observed Tons	N/A	N/A	N/A	N/A
		Mean CPUE (mt/hr)	N/A	N/A	N/A	N/A
		Variance	N/A	N/A	N/A	N/A
		Weighting Factor	N/A	N/A	N/A	N/A
	3	Observations	N/A	N/A	N/A	N/A
		Observed Tons	N/A	N/A	N/A	N/A
		Mean CPUE (mt/hr)	N/A	N/A	N/A	N/A
		Variance	N/A	N/A	N/A	N/A
		Weighting Factor	N/A	N/A	N/A	N/A
	4	Observations	N/A	N/A	N/A	N/A
		Observed Tons	N/A	N/A	N/A	N/A
		Mean CPUE (mt/hr)	N/A	N/A	N/A	N/A
		Variance	N/A	N/A	N/A	N/A
		Weighting Factor	N/A	N/A	N/A	N/A

Table 8. Results of weighted regression analyses of log(Pollock CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_i), and interactions for domestic fisheries.

Pollock (Bottom)	1989	Predictor	Coef	Stdev	t-ratio	p
		Constant	1.9836	0.2313	8.58	0.000
		I/O	-0.4345	0.2734	-1.59	0.118
		Q2	0.3202	0.3318	0.96	0.339
		Q3	-0.0397	0.3327	-0.12	0.906
		I/O * Q2	0.4542	0.4649	0.98	0.333
		I/O * Q3	0.1470	0.4124	0.36	0.723

Table 9. Pollock CPUE statistics for the joint venture pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
84	1	Observations	[illegible]	0.0	N/A	N/A
		Observed Tons	[illegible]	0.0	N/A	N/A
		Mean CPUE (mt/hr)	[illegible]	0.0	N/A	N/A
		Variance	[illegible]	0.0	N/A	N/A
		Weighting Factor	[illegible]	0.0	N/A	N/A
	2	Observations	7.0	4.0	N/A	N/A
		Observed Tons	8,605.3	1,049.8	N/A	N/A
		Mean CPUE (mt/hr)	76.0	31.6	N/A	N/A
		Variance	116.8	313.5	N/A	N/A
		Weighting Factor	0.1	0.1	N/A	N/A
	3	Observations	13.0	8.0	N/A	N/A
		Observed Tons	2,561.1	946.8	N/A	N/A
		Mean CPUE (mt/hr)	19.5	19.6	N/A	N/A
		Variance	21.6	22.6	N/A	N/A
		Weighting Factor	0.2	0.2	N/A	N/A
	4	Observations	[illegible]	0.0	N/A	N/A
		Observed Tons	108.3	0.0	N/A	N/A
		Mean CPUE (mt/hr)	[illegible]	0.0	N/A	N/A
		Variance	0.0	0.0	N/A	N/A
		Weighting Factor	0.0	0.0	N/A	N/A
85	1	Observations	1.0	0.0	N/A	N/A
		Observed Tons	412.0	0.0	N/A	N/A
		Mean CPUE (mt/hr)	14.9	0.0	N/A	N/A
		Variance	0.0	0.0	N/A	N/A
		Weighting Factor	0.0	0.0	N/A	N/A
	2	Observations	11.0	2.0	N/A	N/A
		Observed Tons	5,595.4	275.4	N/A	N/A
		Mean CPUE (mt/hr)	6.3	4.3	N/A	N/A
		Variance	2.5	0.0	N/A	N/A
		Weighting Factor	0.8	0.0	N/A	N/A
	3	Observations	10.0	8.0	N/A	N/A
		Observed Tons	2,101.4	1,778.7	N/A	N/A
		Mean CPUE (mt/hr)	3.9	4.5	N/A	N/A
		Variance	0.2	1.0	N/A	N/A
		Weighting Factor	2.1	1.0	N/A	N/A
	4	Observations	5.0	1.0	N/A	N/A
		Observed Tons	795.2	79.1	N/A	N/A
		Mean CPUE (mt/hr)	5.0	3.4	N/A	N/A
		Variance	0.5	0.0	N/A	N/A
		Weighting Factor	1.4	0.0	N/A	N/A

Table 9. Continued.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
86	1	Observations	[redacted]	[redacted]	N/A	N/A
		Observed Tons	[redacted]	[redacted]	N/A	N/A
		Mean CPUE (mt/hr)	[redacted]	[redacted]	N/A	N/A
		Variance	[redacted]	[redacted]	N/A	N/A
		Weighting Factor	[redacted]	[redacted]	N/A	N/A
	2	Observations	[redacted]	[redacted]	N/A	N/A
		Observed Tons	[redacted]	[redacted]	N/A	N/A
		Mean CPUE (mt/hr)	[redacted]	[redacted]	N/A	N/A
		Variance	[redacted]	[redacted]	N/A	N/A
		Weighting Factor	[redacted]	[redacted]	N/A	N/A
	3	Observations	12.0	9.0	N/A	N/A
		Observed Tons	11,588.6	7,870.8	N/A	N/A
		Mean CPUE (mt/hr)	5.9	5.3	N/A	N/A
		Variance	0.8	0.2	N/A	N/A
		Weighting Factor	1.2	2.3	N/A	N/A
	4	Observations	14.0	4.0	N/A	N/A
		Observed Tons	20,046.5	512.1	N/A	N/A
		Mean CPUE (mt/hr)	5.2	3.3	N/A	N/A
		Variance	0.2	0.4	N/A	N/A
		Weighting Factor	2.5	1.6	N/A	N/A
87	1	Observations	16.0	6.0	N/A	N/A
		Observed Tons	8,225.2	10,085.2	N/A	N/A
		Mean CPUE (mt/hr)	9.4	10.5	N/A	N/A
		Variance	0.5	8.0	N/A	N/A
		Weighting Factor	1.4	0.4	N/A	N/A
	2	Observations	12.0	49.0	N/A	N/A
		Observed Tons	8,377.1	18,543.2	N/A	N/A
		Mean CPUE (mt/hr)	7.3	7.1	N/A	N/A
		Variance	1.1	0.9	N/A	N/A
		Weighting Factor	1.0	1.1	N/A	N/A
	3	Observations	4.0	18.0	N/A	N/A
		Observed Tons	1,000.4	13,465.7	N/A	N/A
		Mean CPUE (mt/hr)	4.5	6.1	N/A	N/A
		Variance	0.4	0.5	N/A	N/A
		Weighting Factor	1.5	1.4	N/A	N/A
	4	Observations	1.0	8.0	N/A	N/A
		Observed Tons	20.8	2,854.1	N/A	N/A
		Mean CPUE (mt/hr)	1.9	8.8	N/A	N/A
		Variance	0.0	0.8	N/A	N/A
		Weighting Factor	0.0	1.3	N/A	N/A

Continued

Table 9. Concluded.

			Pollock (Bottom)		Pollock (Midwater)	
Yr	Qtr	Parameter	Inside	Outside	Inside	Outside
88	1	Observations	15.0	12.0	N/A	N/A
		Observed Tons	14,673.7	3,215.7	N/A	N/A
		Mean CPUE (mt/hr)	15.2	8.4	N/A	N/A
		Variance	5.6	5.1	N/A	N/A
		Weighting Factor	0.4	0.4	N/A	N/A
	2	Observations	12.0	24.0	N/A	N/A
		Observed Tons	10,205.3	6,169.8	N/A	N/A
		Mean CPUE (mt/hr)	7.7	7.0	N/A	N/A
		Variance	3.7	1.4	N/A	N/A
		Weighting Factor	0.5	0.9	N/A	N/A
	3	Observations	6.0	6.0	N/A	N/A
		Observed Tons	1,952.8	4,570.5	N/A	N/A
		Mean CPUE (mt/hr)	8.2	7.8	N/A	N/A
		Variance	6.2	1.3	N/A	N/A
		Weighting Factor	0.4	0.9	N/A	N/A
	4	Observations	1.0	4.0	N/A	N/A
		Observed Tons	115.4	1,125.7	N/A	N/A
		Mean CPUE (mt/hr)	4.2	6.2	N/A	N/A
		Variance	0.0	6.8	N/A	N/A
		Weighting Factor	0.0	0.4	N/A	N/A

Table 10. Results of weighted regression analyses of log(Pollock CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_j), and interactions for joint venture fisheries.

Pollock (Bottom)	1984	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.8553	0.2466	11.58	0.000
		I/O	-0.0444	0.3121	-0.14	0.888
		Q2	0.4134	0.7169	0.58	0.569
		I/O * Q2	0.7467	0.8418	0.89	0.383
	1985	Predictor	Coef	Stdev	t-ratio	
		Constant	1.4818	0.3092	4.79	0.000
		I/O	-0.2720	0.3646	-0.75	0.466
	1986	Predictor	Coef	Stdev	t-ratio	p
		Constant	1.1796	0.1137	10.38	0.000
		I/O	0.4842	0.1236	3.92	0.000
		Q3	0.5459	0.1302	4.19	0.000
		I/O * Q3	-0.4900	0.1593	-3.08	0.004
	1987	Predictor	Coef	Stdev	t-ratio	p
		Constant	1.4650	0.1084	13.52	0.000
		I/O	0.1355	0.2479	0.55	0.586
		Q1	0.4401	0.3899	1.13	0.262
		Q2	0.2743	0.1322	2.07	0.041
		I/O * Q1	0.1467	0.4639	0.32	0.753
		I/O * Q2	0.0554	0.3050	0.18	0.856
	1988	Predictor	Coef	Stdev	t-ratio	p
		Constant	2.0420	0.2084	9.80	0.000
		I/O	0.0891	0.3696	0.24	0.810
		Q1	0.1216	0.2927	0.42	0.679
		Q2	-0.0986	0.2332	-0.42	0.674
		I/O * Q1	0.1882	0.4629	0.41	0.686
		I/O * Q2	-0.0762	0.4286	-0.18	0.859

Table 11. Pollock CPUE statistics for the foreign pollock (bottom) and pollock (midwater) trawl fisheries inside and outside the HVOA. Month/Block/Year records with fewer than three tows were not included. Shaded quarters were not included in the accompanying regression analyses.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
81	1	Observations	0.0	14.0	N/A	N/A
		Observed Tons	0.0	1,197.8	N/A	N/A
		Mean CPUE (mt/hr)	0.0	2.7	N/A	N/A
		Variance	0.0	0.3	N/A	N/A
		Weighting Factor	0.0	2.3	N/A	N/A
	2	Observations	3.0	16.0	N/A	N/A
		Observed Tons	1,149.7	2,608.9	N/A	N/A
		Mean CPUE (mt/hr)	4.1	3.3	N/A	N/A
		Variance	0.3	0.2	N/A	N/A
		Weighting Factor	1.9	2.3	N/A	N/A
	3	Observations	6.0	10.0	N/A	N/A
		Observed Tons	590.6	321.9	N/A	N/A
		Mean CPUE (mt/hr)	4.5	1.7	N/A	N/A
		Variance	0.4	0.4	N/A	N/A
		Weighting Factor	1.6	1.5	N/A	N/A
	4	Observations	8.0	16.0	N/A	N/A
		Observed Tons	1,234.1	769.7	N/A	N/A
		Mean CPUE (mt/hr)	4.4	2.7	N/A	N/A
		Variance	0.4	0.8	N/A	N/A
		Weighting Factor	1.6	1.1	N/A	N/A
82	1	Observations	0.0	3.0	N/A	N/A
		Observed Tons	0.0	121.2	N/A	N/A
		Mean CPUE (mt/hr)	0.0	4.3	N/A	N/A
		Variance	0.0	6.7	N/A	N/A
		Weighting Factor	0.0	0.4	N/A	N/A
	2	Observations	1.0	21.0	N/A	N/A
		Observed Tons	377.9	5,148.5	N/A	N/A
		Mean CPUE (mt/hr)	4.2	3.8	N/A	N/A
		Variance	0.0	0.2	N/A	N/A
		Weighting Factor	0.0	2.3	N/A	N/A
	3	Observations	14.0	34.0	N/A	N/A
		Observed Tons	10,551.3	2,914.7	N/A	N/A
		Mean CPUE (mt/hr)	6.8	3.4	N/A	N/A
		Variance	0.8	0.8	N/A	N/A
		Weighting Factor	1.1	1.1	N/A	N/A
	4	Observations	7.0	24.0	N/A	N/A
		Observed Tons	3,711.9	1,561.0	N/A	N/A
		Mean CPUE (mt/hr)	5.1	3.2	N/A	N/A
		Variance	0.6	0.4	N/A	N/A
		Weighting Factor	1.3	1.7	N/A	N/A

Table 11. Continued.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
83	1	Observations	0.0	15.0	N/A	N/A
		Observed Tons	0.0	[illegible]	N/A	N/A
		Mean CPUE (mt/hr)	0.0	2.1	N/A	N/A
		Variance	0.0	0.2	N/A	N/A
		Weighting Factor	0.0	2.3	N/A	N/A
	2	Observations	4.0	40.0	N/A	N/A
		Observed Tons	604.1	8,562.5	N/A	N/A
		Mean CPUE (mt/hr)	4.8	4.5	N/A	N/A
		Variance	1.0	0.2	N/A	N/A
		Weighting Factor	1.0	2.2	N/A	N/A
	3	Observations	7.0	32.0	N/A	N/A
		Observed Tons	6,425.6	2,744.6	N/A	N/A
		Mean CPUE (mt/hr)	7.3	4.4	N/A	N/A
		Variance	0.7	0.7	N/A	N/A
		Weighting Factor	1.2	1.2	N/A	N/A
	4	Observations	6.0	33.0	N/A	N/A
		Observed Tons	9,723.1	4,542.6	N/A	N/A
		Mean CPUE (mt/hr)	7.1	3.4	N/A	N/A
		Variance	0.5	0.7	N/A	N/A
		Weighting Factor	1.4	1.2	N/A	N/A
84	1	Observations	0.0	5.0	N/A	N/A
		Observed Tons	0.0	420.3	N/A	N/A
		Mean CPUE (mt/hr)	0.0	4.5	N/A	N/A
		Variance	0.0	3.8	N/A	N/A
		Weighting Factor	0.0	0.5	N/A	N/A
	2	Observations	3.0	18.0	N/A	N/A
		Observed Tons	454.6	1,692.9	N/A	N/A
		Mean CPUE (mt/hr)	6.1	3.4	N/A	N/A
		Variance	0.5	0.2	N/A	N/A
		Weighting Factor	1.4	2.1	N/A	N/A
	3	Observations	3.0	44.0	N/A	N/A
		Observed Tons	930.7	6,822.9	N/A	N/A
		Mean CPUE (mt/hr)	7.2	6.1	N/A	N/A
		Variance	2.5	0.8	N/A	N/A
		Weighting Factor	0.6	1.1	N/A	N/A
	4	Observations	8.0	20.0	N/A	N/A
		Observed Tons	8,529.6	4,767.8	N/A	N/A
		Mean CPUE (mt/hr)	6.7	5.4	N/A	N/A
		Variance	0.6	0.5	N/A	N/A
		Weighting Factor	1.3	1.5	N/A	N/A

Continued

Table 11. Concluded.

Yr	Qtr	Parameter	Pollock (Bottom) Inside	Pollock (Bottom) Outside	Pollock (Midwater) Inside	Pollock (Midwater) Outside
85	1	Observations	0.0	1.0	N/A	N/A
		Observed Tons	0.0	32.6	N/A	N/A
		Mean CPUE (mt/hr)	0.0	4.3	N/A	N/A
		Variance	0.0	0.0	N/A	N/A
		Weighting Factor	0.0	0.0	N/A	N/A
	2	Observations	0.0	10.0	N/A	N/A
		Observed Tons	0.0	3,318.0	N/A	N/A
		Mean CPUE (mt/hr)	0.0	4.7	N/A	N/A
		Variance	0.0	0.5	N/A	N/A
		Weighting Factor	0.0	1.4	N/A	N/A
	3	Observations	2.0	32.0	N/A	N/A
		Observed Tons	478.0	23,580.5	N/A	N/A
		Mean CPUE (mt/hr)	6.5	6.3	N/A	N/A
		Variance	0.0	0.9	N/A	N/A
		Weighting Factor	0.0	1.1	N/A	N/A
	4	Observations	6.0	65.0	N/A	N/A
		Observed Tons	8,506.8	15,178.1	N/A	N/A
		Mean CPUE (mt/hr)	6.4	4.7	N/A	N/A
		Variance	0.8	0.2	N/A	N/A
		Weighting Factor	1.1	2.1	N/A	N/A
86	1	Observations	0.0	2.0	N/A	N/A
		Observed Tons	0.0	219.9	N/A	N/A
		Mean CPUE (mt/hr)	0.0	15.4	N/A	N/A
		Variance	0.0	0.0	N/A	N/A
		Weighting Factor	0.0	0.0	N/A	N/A
	2	Observations	0.0	7.0	N/A	N/A
		Observed Tons	0.0	3,743.4	N/A	N/A
		Mean CPUE (mt/hr)	0.0	4.9	N/A	N/A
		Variance	0.0	0.3	N/A	N/A
		Weighting Factor	0.0	1.7	N/A	N/A
	3	Observations	5.0	25.0	N/A	N/A
		Observed Tons	1,526.9	9,503.8	N/A	N/A
		Mean CPUE (mt/hr)	8.3	8.9	N/A	N/A
		Variance	1.0	0.7	N/A	N/A
		Weighting Factor	1.0	1.2	N/A	N/A
	4	Observations	7.0	14.0	N/A	N/A
		Observed Tons	3,158.9	1,314.8	N/A	N/A
		Mean CPUE (mt/hr)	9.5	5.4	N/A	N/A
		Variance	1.5	1.7	N/A	N/A
		Weighting Factor	0.8	0.8	N/A	N/A

Table 12. Results of weighted regression analyses of log(Pollock CPUE) against dummy variables for area (I/O = inside or outside HVOA), quarter (Q_i), and interactions for foreign fisheries.

	Year	Predictor	Coef	Stdev	t-ratio	p
Pollock (Bottom)	1981	Constant	0.5764	0.2069	2.79	0.007
		I/O	0.8218	0.3217	2.55	0.014
		Q2	0.4674	0.2530	1.85	0.070
		Q3	-0.1227	0.3069	-0.40	0.691
		I/O * Q2	-0.5097	0.5111	-1.00	0.323
		I/O * Q3	-0.0324	0.4868	-0.07	0.947
	1982	Constant	0.9306	0.2040	4.56	0.000
		I/O	0.5654	0.4746	1.19	0.237
		Q3	-0.2528	0.2909	-0.87	0.388
		I/O * Q3	0.3218	0.6142	0.52	0.602
	1983	Constant	0.6371	0.1578	4.04	0.000
		I/O	1.1743	0.3771	3.11	0.002
		Q2	0.5739	0.1903	3.01	0.003
		Q3	0.5080	0.2259	2.25	0.026
		I/O * Q2	-1.0178	0.6328	-1.61	0.110
		I/O * Q3	-0.6169	0.5395	-1.14	0.255
	1984	Constant	1.4778	0.1382	10.70	0.000
		I/O	0.3574	0.2701	1.32	0.189
		Q2	-0.3831	0.1847	-2.07	0.041
		Q3	-0.0125	0.1750	-0.07	0.943
		I/O * Q2	0.4045	0.4752	0.85	0.397
		I/O * Q3	0.1480	0.6172	0.24	0.811
	1985	Constant	1.33634	0.07283	18.35	0.000
		I/O	0.1222	0.3341	0.37	0.716
	1986	Constant	1.4475	0.2038	7.10	0.000
		I/O	0.5470	0.3450	1.59	0.120
		Q3	0.5358	0.2373	2.26	0.029
		I/O * Q3	-0.5497	0.4699	-1.17	0.248

5.0 SOCIAL IMPACTS

5.1 Introduction

The social impact assessment (SIA) prepared for Amendment 18/23 profiled six study communities (Kodiak, Sand Point, St. Paul, Unalaska, Bellingham, and Newport) in relation to their participation in the Alaska groundfish fisheries. The social impact assessment included in the SEIS contains detailed community profiles[1]. The SIA appraised the social and economic effects that the Council's specified allocative alternatives would have upon these communities. In addition to the initial six communities, a limited analysis of fisheries related issues in Ballard/Seattle was included as an addendum to the SIA.

Due to time constraints and limited analytical resources, this review of existing social impact analysis does not constitute an additional SIA. To conduct such a task would require a new scoping process, followed by a social factor analysis of the status quo (baseline case) and the estimation of social change for each alternative relative to the baseline. A complete SIA would then include an assessment of impacts to be presented to the Council and public as part of the FMP amendment package. Rather, this chapter of the supplementary analysis will first present a summary of the original SIA's findings for just the BSAI communities profiled. Information will then be reviewed regarding the effects of a community development quota (CDQ) program, which was not considered when the original SIA was produced. To enhance the social impacts section of this document, additional review of social overhead costs will be presented.

The goal of an SIA, according to NMFS operational guidelines, is to answer such basic questions as: 1) who will be affected; 2) what will happen to the people affected; and 3) what social changes will occur under each proposed management alternative. In other words, the SIA should answer the question: How will each of the proposed changes affect the social fabric and stability of the fishery and fishing communities? This supplemental analysis provides a review of and update to the original SIA in its particular relevance to the revised Amendment 18.

5.2 Review of BSAI Findings from Original SIA

The SIA concluded that the smaller Alaska communities, which are the communities most fundamentally dependent on the groundfish fishery, exhibited the most variability and greatest vulnerability to socially disruptive forces. Evidence of the vulnerability of coastal communities was demonstrated by the social and economic impacts of preemption created when offshore catcher-processors moved into the Gulf of Alaska unexpectedly in March of 1989. Groundfish processors claim that their plant capacities were being under-utilized due to the unavailability of fish. In 1989 the plants processed pollock only 90-95 days. All the communities will be negatively affected by a continuation of the olympic system *status quo*, and all would benefit (to varying degrees) from an inshore allocation.

The different options that were considered within the inshore/offshore allocation also produced different outcomes in each study community, but the differences were not precise enough to draw direct comparisons between them. In other words, the benefits or losses to one community could not be directly

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[1]The SIA was conducted by Impact Assessments, Inc., of LaJolla, California. In-depth community profiles of the six study communities were developed as a part of the SIA, and included as a supplementary report by the contractors. Copies of the complete community demographic profiles--as summarized in the SIS--are available from the Council office in Anchorage.

compared to benefits or losses in another community. According to the study, the most extreme inshore allocations provide the greatest benefit for the Alaska coastal communities and afford them the greatest chance for development and growth. The study also noted that, while an inshore allocation would clearly benefit the Alaska coastal communities at least in the short-term, such an allocation would not guarantee community stability in the long-term, as the plan does not provide protection from continuing competition within industry sectors, stock reductions, price fluctuations, or other non-allocation factors. It is far easier to accurately predict short-term social consequences in these communities than long-term consequences. The SIA stated that the Alaska communities were judged to be able to absorb the potential social disruptions associated with the increased growth the allocation alternatives may bring, although such changes will impose social costs. Regarding the Pacific Northwest communities, the SIA concluded that the tradeoffs that would result from the allocations would be located mostly in Ballard/Seattle, and were judged to be well within the limits of change that can be handled by the economic/social structures of that community.

Because the scope of the SIA was limited to those towns included in the community profiles document, namely communities with ties to the shore-based trawler fleet, the Council received criticism that the SIA was more of a benefits study, rather than an assessment that could be used to weigh community benefits in Alaska against employment losses in the Pacific Northwest. For this supplemental review, however, only those communities in the BSAI, such as Unalaska and St. Paul will be reviewed. Unalaska, according to the original SIA, is a community with ties to both the shore-based and offshore-based trawler fleets.

Examining the SIA's conclusions for the individual communities affected by a BSAI allocation of pollock, Unalaska clearly benefits both economically and socially from an inshore allocation. This is indicated both in the economic impact estimates contained in Section 3. Generally, the Unalaska/Dutch Harbor community economy derives net gains in employment and income from inshore allocations, as estimated in Section 3. Such generalizations, however, likely overlook the transactions costs and social impacts created by the respective changes to the two respective inshore and offshore sectors.

The SIA also suggests that Unalaska is likely to be destabilized by the continuance of the status quo. Without an inshore allocation Unalaska will certainly remain a viable community, but it is likely that some inshore processors will go out of business and many will certainly operate seasonally resulting in economic downturn, an increase in transient labor, and social "marginalization." The community would continue to receive some economic benefit from offshore fishing activity.

St. Paul, as a community explicitly in need of the development of a local sustainable economy, is representative of many communities in Western Alaska. With a small resident fleet, few shore-based processing facilities and little or no competitive history in the groundfish fisheries, St. Paul faces unique obstacles in developing the inherent fishery development potential of its area. However, if St. Paul, and other disadvantaged communities, are ever to have a place in the groundfish fishery, some form of inshore allocation, and/or a CDQ allotment, may be necessary.

Ballard/Seattle will be the only community of those studied that will be negatively impacted in any significant way by an inshore/offshore allocation, according to the SIA. Part of this effect will result directly from the reduced activity of the factory trawler fleet. Much of the negative impact would be less direct, however, and would occur in the support sector and non-fishing related areas. The PNW experiences direct losses in income and employment as a result of the proposed allocations, partially offset by the gain to Alaska communities. The loss in the PNW could be expected to occur over time rather than all at once. The positive effects of an inshore allocation to the Alaska communities will be immediate and direct; the negative effects of such an action to the Pacific Northwest would be less immediate and less direct. In addition, the SIA noted that the continuation of the status quo would have immediate and direct negative consequences for economic development and social stability in the Alaska communities, while having very little positive impact on economic development or social stability in the Pacific Northwest. This summarizes the salient findings of the original SIA.

5.3 Role of the Pollock CDQ Program

One portion of Amendment 18 that has been approved is a Western Alaska Community Development Quota (CDQ) program. The Council proposed this program to help develop commercial fisheries in communities on the Bering Sea coast by allowing them exclusive access to up to half of the pollock apportioned to nonspecific reserves at the beginning of the fishing year (i.e., 7.5 percent of the total allowable catch of pollock in the BSAI area). The Council's intent with the CDQ program is to increase the economic and social stability of these coastal Alaska communities by making resource availability more predictable, and to therefore foster a stable, self-sustaining economy in communities that most need development. The CDQ program is a means to allow these communities to attain their social and economic goals. It helps communities diversify local economies by providing residents with stable long-term employment and opportunities in the BSAI fisheries, which have been foreclosed to them because of high capital investments needed to enter the fishery.

The amount of pollock available for the CDQ program will be made available at the beginning of the fishing year for allocation to qualifying community development projects in western Alaska. The set-aside amount will be reduced as allocations are made to fishery development projects. To be eligible, a community must meet specified criteria and have an approved fishery development plan (FDP). The criteria for community eligibility will be established by the Governor of Alaska, in consultation with the Council and approved by the Secretary. Individual FDPs recommended by the Governor of Alaska, after consultation with the Council, will be reviewed by the Secretary for consistency with the criteria. Actual allocations of pollock to the communities under the CDQ program would be announced annually by the Secretary.

With this program, communities approved for CDQ allocations of pollock will receive benefits from the BSAI pollock fishery, which otherwise would be closed off to them. The CDQ program may or may not ensure economic self-sufficiency and stability, but at the minimum it would provide a basis for achieving those goals. Examples of benefits include increases in community sales tax revenues based on fish purchases, state revenue sharing through the state raw fish tax and employment opportunities in both the fishing and processing (shoreside and factory trawler) sectors. As noted, St. Paul represents many disadvantaged communities in Western Alaska around the Bering Sea. The CDQ program, by ensuring a stable supply of pollock to the company developing the processing facility on the island, would assist the St. Paul economy by providing benefits to the village Native corporation, the City of St. Paul and its residents. If a CDQ results in continued development of shoreside processing facilities in St. Paul, then the social impacts associated with such growth would be similar to the impacts presented in the original SIA for an inshore allocation. On the other hand, if St. Paul receives a CDQ and leases it to an existing fishing operation in lieu of expanding its own shoreside facilities, then the impacts resulting from additional revenue to the community may be more limited. In addition, the social analysis also concluded that few of the positive effects of an inshore allocation would be realized in St. Paul unless the Pribilof Islands were to receive a specific allocation. Thus, specific community development quotas may be necessary to address the unique situations of such locations as St. Paul and other disadvantaged communities. Although St. Paul has been used in the above illustration of the use and impacts of CDQs, there are over sixty communities that would be eligible to receive CDQs under draft guidelines developed to date. These eligible communities are listed in Table 5.1.

5.4 Social Overhead Costs (Infrastructure)

As part of its general conclusion, the SIA indicates that only in the short-term, and in extreme situations where substantial allocations of TAC are made to the inshore sector, would shore-based communities be incapable of accommodating the resulting increased pressure on social services (i.e., public safety, education and health) and infrastructure (i.e., water, sewer and transportation). Some comments received on the SEIS took exception to this conclusion, arguing that adverse effects on the communities would be greater than expressed in the SIA. To augment the original SIA, this supplement will review the portions of the SIA that address social services and infrastructure, and provide additional information.

The growth of the shoreside labor force has been rapid and significant due to recent investment in the onshore fish processing sector. As discussed in the original SIA, housing of all sorts in Unalaska is in short supply, so that even some long-term employees who should be living in apartments are living in company bunkhouses. Most fish processors in Unalaska would prefer to operate year-round with a steady level of production, which has resulted in a trend toward a more stable (less transient) labor force, according to the SIA. Since there are still fluctuations in fish supply (and hence periods of varying labor needs) there is still a significant amount of "imported" transient labor. An inshore allocation would be expected to create, or maintain, an immediate need for labor that will require onshore processors to bring in people from "outside." The extent to which these people become more permanent, year-round, residents will depend on the degree to which onshore processing plants can operate continuously at a fairly stable production level. Operating consistency, in turn, will depend on the supply of fish and the competition for this supply. These factors are not predictable. An onshore allocation would clearly serve as a stabilizing factor for the onshore processing sector and its labor force, if other factors are held constant.

It can be expected that there will be a net population increase in Unalaska as a result of an inshore allocation. While this may be expected to exacerbate Unalaska's housing shortage, group quarters at processing facilities are not utilized to capacity year-round, and it is likely that increases in jobs will come in the form of more stable year-round operations. Consequently, housing will not be affected as severely as might be anticipated. Household size statistics mean little in Unalaska, and many of these people would most likely be single in any event and live in group quarters, so the overall increase, taking place over several years, should be comparable to or smaller than increases over the last ten years. Between 1980 and 1990, according to U.S. Census figures, Unalaska has grown in population from 1,322 to 3,089, an increase of 234 percent.

The housing shortage in Unalaska reflects the development resulting from growth in the shoreside groundfish processing facilities. It can also be expected that the demand for other services, such as education and health, and community infrastructure, such as water and sewer, will also continue to increase. For example, the SIA points out that attendance at the school in Unalaska is projected to increase as the community continues to grow. As of the beginning of the 1990-1991 school year Unalaska had just completed a new school remodeling project that doubled the size of the original school. Nonetheless, this facility still cannot meet present demand. After spending $8.5 million for the expansion, the superintendent estimated that the school was still at least two classrooms too small in terms of the needs for the 1991-1992 school year.

The city of Unalaska has also responded to the expanding processing industry by upgrading the city water system. The city recently invested $9 million replacing World War II-era pipes and drilling new wells, completing three phases of a four-phase project. With a capacity of 10 million gallons a day, Unalaska's water system is the third largest in the state. However, the water system is barely able to meet peak demands during certain times of the year (personal communication with Senator Zharoff's staff).

Increased demand on social services due to the expanding groundfish fishery was also reviewed in the SIA. The most apparent service needed is a new medical clinic. With three physicians assistants on staff, the existing facility is taxed to the limit. In addition to taking care of people in the town, the clinic cares for sick and injured fisherman off the at-sea fleet. A fund-raising drive started in the summer of 1991 for a new $6 million clinic. The town raised $3 million locally and received $300,000 from the State of Alaska in 1991. Currently, $1,000,000 was appropriated by the state legislature in the State's 1992-1993 capital construction budget, which is waiting the governor's signature. Groundbreaking for the new clinic has begun; however, the town is still in need of $1.7 million to complete funding for this facility.

Unalaska also is the closest developed community to the high seas groundfish area. For that reason, pressures on the existing social services and infrastructure could be expected to increase to some degree no matter which sector — inshore or offshore — grows the most in the coming years. Whether the new population of workers is transient or more permanent, whether they originate from the shoreside or offshore sectors, they will present the city of Dutch Harbor/Unalaska with comparable, though very different, challenges. These impacts are a result of an expanding economy and are not unique to the fishing-based community. Disruptions to community stability is understood by the community and the city is taking measures to address these disruptions.

Table 5.1 Geographically Eligible Coastal Communities Within 50 Miles of the Bering Sea

Akutan	Aleutian
Atka	Aleutian
False Pass	Aleutian
Nelson Lagoon	Aleutian
Nikolski	Aleutian
Port Heiden (Meschick)	Aleutian
St. George	Aleutian
St. Paul	Aleutian
Unalaska	Aleutian
Gambell	Bering Sea
Northeast Cape	Bering Sea
Savoonga	Bering Sea
Brevig Mission	Bering Strait
Elim	Bering Strait
Golovin	Bering Strait
Inalik	Bering Strait
Koyuk	Bering Strait
Nome	Bering Strait
Shaktoolik	Bering Strait
St. Michael	Bering Strait
Stebbins	Bering Strait
Teller	Bering Strait
Unalakleet	Bering Strait
Wales	Bering Strait
White Mountain	Bering Strait
Aleknagik	Bristol Bay
Clark's Point	Bristol Bay
Dillingham	Bristol Bay
Egegik	Bristol Bay
Ekuk	Bristol Bay
King Salmon	Bristol Bay
Manokotak	Bristol Bay
Naknek	Bristol Bay
Pilot Point	Bristol Bay
South Naknek	Bristol Bay
Sovonoski	Bristol Bay
Togiak	Bristol Bay
Twin Hills	Bristol Bay
Ugashik	Bristol Bay
Alakanuk	Southwest Coastal Lowland
Bill Moore's	Southwest Coastal Lowland
Chanilut,	Southwest Coastal Lowland
Chefornak	Southwest Coastal Lowland
Chevak	Southwest Coastal Lowland
Eek	Southwest Coastal Lowland
Emmonak	Southwest Coastal Lowland
Goodnews Bay	Southwest Coastal Lowland
Hamilton	Southwest Coastal Lowland
Hooper Bay	Southwest Coastal Lowland
Kipnuk	Southwest Coastal Lowland
Kongiganak	Southwest Coastal Lowland
Kotlik	Southwest Coastal Lowland
Kwigillingok	Southwest Coastal Lowland
Mekoryuk	Southwest Coastal Lowland
Newtok	Southwest Coastal Lowland
Nightmute	Southwest Coastal Lowland
Platinum	Southwest Coastal Lowland
Quinhagak	Southwest Coastal Lowland
Scammon Bay	Southwest Coastal Lowland
Sheldon's Point	Southwest Coastal Lowland
Toksook Bay	Southwest Coastal Lowland
Tununak	Southwest Coastal Lowland
Tuntutuliak	Southwest Coastal Lowland

6.0 SUMMARY

In March 1992, the Commerce Department approved portions of the North Pacific Fishery Management Council's Amendment 18 to the Bering Sea/Aleutian Islands fishery management plan to allocate the pollock total allowable catch between defined inshore and offshore segments of the industry. The Undersecretary for Oceans and Atmosphere accepted for the remainder of 1992 a division of the BSAI pollock TAC between inshore and offshore segments, including the designation of an inshore operational area around Dutch Harbor that excludes fishing operations by offshore processors. Conditional approval was also granted to a program that will set aside 7.5 percent of the pollock TAC for purposes of economic development by qualifying native communities along the Bering Sea. The Commerce Department sent back for further economic review the BSAI inshore/offshore allocation plan for 1993-95, urging the Council to resubmit an alternative plan and supplementary analysis that could be implemented in time for the 1993 season.

In response to the Commerce Department decision, the Council developed a revised set of management alternatives, and has undertaken a supplemental analysis to the original SEIS that estimates key economic impacts of the proposed alternatives. As expressed in the Commerce Department's recommendation to the Council; the supplementary analysis refines the assumptions and methodology of the economic analysis, and evaluate the economic effects of each reasonable alternative in addressing the preemption problem in the 1993-95 time period.

The problem the Council is attempting to solve with the proposed alternatives is the same as that defined in the original SEIS; ***the underlying problem addressed in the proposed amendment is one of resource allocation, where one industry sector faces preemption by another.*** The revised management options considered in this supplementary analysis include three alternatives. The first option (Alternative 1) is the status quo, or "no action" alternative, that would maintain the olympic system of access, without a prescribed inshore/offshore allocation. The second option (Alternative 2) fixes the inshore/offshore allocation over the next three years at essentially the current shares accounted for by the two sectors; 30 percent inshore and 70 percent offshore. A second apportionment (Alternative 3) dedicates a preferential share of the TAC to the inshore sector, scaled from a 35/65 allocation (inshore/offshore) in 1993, increasing to 40/60 in 1994, and 45/55 in 1994. A catcher vessel operational area around Dutch Harbor is considered as a further option under both Alternatives 2 and 3.

The effect of the prescribed allocations is to split the pollock quota between the defined inshore and offshore sectors, thereby protecting the allocated inshore catch quota from preemptive intrusion by the more mobile offshore component. The determination of appropriate allocations between the two sectors has a direct impact on the economic performance of the catchers and processors involved. The thrust of the supplementary analysis presented here is to examine certain economic impacts estimated to result from these allocations. As directed by the Commerce Department decision on Amendment 18, the supplemental analysis evaluates the economic effects of the revised alternatives for addressing the preemption problem in 1993 through 1995.

6.1 Analytical Results

6.1.1 Benefit Cost Analysis

The economic impacts resulting from the allocations proposed in Alternatives 2 and 3 are estimated based on the marginal, or incremental impact of the shift in pollock tonnage from the offshore sector to the inshore sector. As such, the gains or losses to one sector may be offset by the impact on the other. It is the difference between the two effects that is of interest in terms of evaluating net economic impacts.

A cost-benefit model was employed to assess the net economic costs and benefits resulting from Alternatives 2 and 3. This criteria incorporates accepted measures of economic efficiency based on estimates of producer surplus accruing under the allocation alternatives. Results of this model indicate that the allocations impose net costs to the extent any allocation increases the share accruing to the inshore sector. The magnitude of the calculated net national loss is proportional to the size of the preferential inshore allocation.

The apparent efficiency of the inshore and offshore sectors is sensitive to the associated costs, revenues, and recovery rates achieved by the respective sectors. The results of the model were tested over two data scenarios, one based on reported price and product recovery rate data available from the National Marine Fishery Service, and the second data scenario reflecting data volunteered by the inshore and offshore sectors of the industry. Both data scenarios resulted in harvest shares somewhat smaller than that reported for the fishery in 1991, a direct result of necessary adjustments made by the analytical team to the product recovery rates used in management of the fishery in 1991.

The magnitude of the estimated economic loss differs between the two data scenarios. Based on the NMFS data assumptions, the allocations proposed under Alternative 2 would result in an estimated aggregate loss of $22.0 million over the three year period, while the estimated impact using the industry data assumptions yields an aggregate loss of $16.7 million. These estimates include a calculation of producer surplus accruing to vessel crews. If the economic benefits accruing just to the processing vessels and plants are considered, the aggregated three year estimated impacts are a net loss of $17.2 million under the NMFS scenario, and $11.3 million using the Industry data scenario.

For Alternative 3, the NMFS scenario leads to a cumulative loss of $85.8 million, and the industry parameters results in a loss of $69.8 million. If the estimated producer surplus attributed to vessel crews is not included, the estimated impacts are a loss of $66.8 million and $47.2 million for the respective NMFS and Industry scenarios. The differences in results between the NMFS and industry data scenarios reflects the sensitivity of the calculated impacts to changes in the underlying price, recovery rate, and crew rent assumptions. The analytical procedure employed in the benefit-cost analysis allowed for the consideration of a range of possible values for these data. Based on an estimated range of possible values for price and recovery rate variables, the analysis indicates that the probability of positive net benefits is approximately 10 percent using the NMFS scenario, and 15 percent based on the industry data scenario.

The economic efficiency results calculated in the cost-benefit model were adjusted to reflect net national economic impacts, making changes for estimated payments to foreigners. The effect of the adjustment for foreign payments tends to increase the magnitude of the apparent net loss, based on assumed 65 percent leakage of benefits to foreign interests in the inshore sector, and 25 percent leakage in the offshore sector. Based on these adjustments, aggregated net national impacts over the three year proposals under the NMFS data scenario are estimated to be a loss of $25.9 million for Alternative 2, and a loss of $101 million under Alternative 3. For the industry data scenario, the estimated impacts are a $24.4 million net loss with Alternative 2 and a $102 million net loss under Alternative 3. The adjustments for foreign leakage increase the apparent loss to the nation because proportionately more of the benefits accruing to the inshore sector are treated as payments to foreign interests, and therefore deducted from national benefits. The estimated impacts of foreign leakage, and associated net national impacts of Alternatives 2 and 3 must be regarded as conjectural, given the lack of empirical data to trace actual payments to foreign interests.

The cost-benefit finding focuses on benefits and costs to the harvesting and processing firms in the industry. Additional analysis was undertaken to explore possible impacts on U.S. consumers resulting from changes in the availability and mix of fillet and surimi products. Using qualified assumptions regarding the nature of consumer demand, and the response of suppliers to this demand, the aggregate consumer impacts of the proposed allocations suggest a net loss over the three year period of roughly $1 million for Alternative 2, and $7 million under Alternative 3. Generally, the size of the consumer impacts was not affected by the choice of the data assumption scenario.

The benefit-cost analysis also included a review of nonmarket resource conservation issues associated with the alternatives. The impacts of pollock discards, and to a lesser extent plant waste disposal, were examined in terms of social valuations that may not be reflected in the producer surplus estimates. The significant discard of pollock, in general, and the apparent differential rate of discards between the inshore and offshore sectors may be relevant in this regard.

6.1.2 Economic Impact Analysis

In addition to the cost-benefit analysis, a separate analysis was conducted on the more general economic impacts affecting direct incomes and employment. These impacts can be traced to specific economic location, to provide a better indication of the distribution impacts of the allocations proposed. These economic impacts also are adjusted to account for payments to foreign interests. Both the NMFS and Industry data scenarios were used in the analysis, but the results were generally comparable, despite significant differences in key data values. The seeming insensitivity of the results to these changes is suspected to be the result of offsetting changes in the modeled inshore and offshore sectors, as well as the adjustment made for foreign payments.

The economic impact analysis performed is an updated version of the finding from the SEIS conducted based on 1989/90 data. Generally, direct income and employment increase in the Dutch Harbor, Akutan, and other Alaska inshore locations under the alternative allocations proportional to the size of the inshore allocation. The offshore sector, principally economic locations in the Pacific Northwest, incurs disproportionate losses in income and employment under these proposals, indicating a net economic loss in these measures as a result of the allocation. These findings are consistent with the results of the cost-benefit analysis, but appear somewhat contrary to those calculated in the original SEIS, which used the same input-output economic impact methodology. The contrast in results calls to question both the dynamic change between the inshore and offshore sectors that may have occurred between 1989 and 1991, as well as the sensitivity of results to changes in the underlying data assumptions.

6.1.3 Catcher Vessel Operational Area

The catcher vessel operational area (CVOA) was designated as an option under Alternatives 2 and 3. This designated area would grant the inshore sector preferential access to the waters extending out approximately 100 miles from Dutch Harbor/Akutan into the Bering Sea, and prohibit or restrict offshore fishing in this zone. Over the past 12 years pollock removals from the CVOA have averaged 445,123 mt. The analysis of potential impacts arising from the CVOA indicates that the inshore sector depends heavily upon this area for pollock harvest (87% in 1989, 88% in 1990, and 93% in 1991). Offshore catcher-processors exhibit a varying lesser dependence on the CVOA, but still relying on the area for a significant portion of total pollock harvest (46% in 1989, 10% in 1990, and 21% in 1991).

Excluding the offshore sector from the CVOA would require this component to fish elsewhere in the BSAI, with uncertain economic and biological impacts. An analysis of catch rates over time both inside and outside the CVOA produced mixed results. Data from 1990 indicates significantly higher catch per unit effort (CPUE) outside the zone, while reports from JV and foreign fisheries indicate higher CPUE inside the zone. Historical data are available to document differences in PSC bycatch rates inside and outside the CVOA. Generally, salmon, herring, and red king crab bycatch was not consistently different in or outside the CVOA between 1981 and 1990, although there were clear differences in selected years. Bycatch of other king crab, along with Opilio Tanner crab bycatch are generally higher outside the zone, while Bairdi Tanner crab and halibut bycatch appears higher inside than outside the CVOA.

Available information indicates that sufficient pollock stocks exist both inside and outside the CVOA to accommodate the allocated shares proposed in Alternatives 2 and 3. The size of pollock inside and outside the CVOA indicates that recruited observed pollock length is generally smaller outside the zone. Average length in and outside of the CVOA varies over and within the years analyzed. Both inside and outside the proposed zone, the average pollock length has historically exceeded 30 centimeters, generally regarded as the minimum acceptable size for processing.

Prohibited or restricted from operations in the CVOA, the offshore sector would presumably shift the displaced harvest effort elsewhere outside the zone. To some extent, the displacement is offset under Alternative 3 by the proportional reduction in harvest share allocated offshore. While population estimates suggest that tonnage, comparable CPUE, and acceptable size of pollock is available outside the CVOA, it is likely that some costs incurred as a result of such displacement by the offshore sector would increase, though any increases are likely to be relatively small in comparison to the aggregate net loss due to a reduced allocation. Such cost increases result from greater expense in exploring new fishing grounds, including logistical costs as the supply network back to Dutch Harbor is extended. The costs and consequences of shifting this effort outside the CVOA also could result in increased gear conflicts with crabbers, as well as aggravate preemption concerns on the part of the developing inshore fishery around the Pribilof Islands.

6.1.4 Social Impacts

The supplemental analysis includes a review of the Social Impact Assessment (SIA) that accompanied the SEIS, focusing on that material directly applicable to Amendment 18 and the Bering Sea/Aleutian Islands. Specific communities examined in the SIA directly impacted by Amendment 18 include Unalaska and St Paul, Alaska, Ballard/Seattle, Washington, and to a lesser extent Bellingham, Washington and Newport, Oregon. The SIA concluded that the smaller Alaska communities are most fundamentally dependent on the groundfish fishery and exhibited the most variability and greatest vulnerability to socially disruptive forces as characterized by preemption by the offshore fleet. The SIA analysis concluded that the most extreme preferential inshore allocations provide the greatest benefit for the Alaska coastal communities, and afford them the greatest chance at economic and social stability. The continuation of the status quo (open access without any allocation) would have immediate and direct negative consequences for economic development and social stability in the Alaska communities, while having very little positive impact on economic development or social stability in the Pacific northwest.

The SIA assessed the capability of Unalaska to absorb the increased demands placed on social services and other community infrastructure that would result from an increase in the BSAI inshore allocation. While recognizing that housing, schools, and medical services are stressed by the increased economic activity in this community, both the inshore and offshore fisheries contribute to this pressure, and as such the consequences are not solely the result of the shorebased pollock industry. Moreover, the stability afforded by a set allocation is expected to reduce the variations in fish supply and associated periods of fluctuating labor requirements. In this regard, an inshore allocation would likely serve as a stabilizing factor for the inshore processing sector and its labor force.

The city of Unalaska has responded to the expanding fish processing activity in recent years by upgrading community services including the city water system, a medical clinic, and education. The costs of such services would most appropriately be borne by those generating the increased demand, rather than the U.S. or Alaska taxpayer in general. The per unit fish tax assessed against inshore landed tonnage offers a means of funding such community infrastructure.

One segment of Amendment 18 given tentative approval by the Commerce Department is directed specifically at the underdeveloped native communities in Western Alaska along the Bering Sea. With this program, communities that are approved for development quotas set aside from the BSAI pollock TAC will receive some benefits from the pollock fishery, which otherwise would be closed off to them under the status quo. By establishing a specific allocation for such purposes, the concerns of disadvantage communities can be addressed separately, rather than as a part of the allocation between the commercial inshore and offshore components.

6.2 Effectiveness of the Revised Alternatives

The Council has developed the proposed alternatives to address problems associated with preemption of the shorebased catching and processing component in the BSAI pollock fishery. Concerns over adverse economic and social consequences borne by the inshore segment due to the destabilizing impact of preemption by offshore catchers and processors led the Council to define the problem as an issue of distribution of benefits from the pollock fishery. The distribution concern is founded in questions of equity, rather than efficiency. As a consequence, the alternatives have been developed to provide stability in terms of resource availability.

The status quo is associated with the destabilizing impacts of overcapitalization and the accompanying race for fish, recognized as a strategic, underlying cause of the problem. The status quo Alternative 1 maintains management of the fishery under the present first-come, first-served conditions that are not expected to offer any resolution to the preemption issue. Dedicated allocations to the inshore sector are viewed as a means of stabilizing and flow of pollock to both components. Under the revised management alternatives, Alternative 2 seeks to fix the inshore and offshore shares at their approximate levels as existed in 1991, while Alternative 3 approximates the inshore shares at levels of planned plant capacity in 1989.

The anticipated gains in inshore operating stability and secured access to the pollock resource attributed to the proposed Alternatives 2 and 3 follow directly from the analysis prepared as a part of the Amendment 18/23 SEIS. Allocating the TAC between inshore and offshore users is expected to provide the inshore sector with some relief from the adverse consequences of preemption by the offshore sector. Benefits of a preferential allocation accrue to the shore-based catchers and processors, along with the affected local port communities. The economic and social benefits to inshore operations arise from increased or stabilized incomes, employment, and related economic activity. Benefits may also derive simply from reductions in the uncertainty, or threat of preemption that accompanies a set allocation. In the case of Alternative 3, the percentage allocations of the TACs to the inshore category will necessitate a lowering of the share of the TACs currently being utilized by the offshore fleet. The reduction in tonnage available to the offshore component will result in economic losses to these operations, their supporting service industries, and communities.

Certain caveats from the SEIS are equally applicable in the supplemental analysis. The sector allocations are not expected to result in permanent solutions to the preemption problem, and are likely to be eroded over time by subsequent preemption within the respective sectors. The vessel moratorium amendment proposed by the Council may slow this process, or prevent a worsening of the overcapitalization problem, but the pollock catching and processing industry already has excess capacity, so competitive pressures are expected to resurface. Like the moratorium, the inshore/offshore allocations are intended as an interim management action to prevent a worsening of the situation while a comprehensive solution is being developed.

At the recommendation of the Commerce Department, the Council has revised the management alternatives intended to address the preemption problem, and provided a comprehensive examination of the net national impacts of these alternatives, consistent with standards expressed in Executive Order 12291. The results of the economic analysis illustrate the dollar magnitude of the benefits and costs incurred by the inshore and offshore components under Alternatives 2 and 3, compared to the status quo economic performance in 1991 modeled as Alternative 1. The cost-benefit analysis allows for the aggregation of considered economic costs and benefits in order to develop an estimate of aggregate or net economic efficiency. The findings indicate a net loss in economic efficiency and net national benefits associated with preferential allocations to the inshore sector. Further allowances made to capture the likely impacts on consumers, as well as adjustment for foreign ownership suggest that the net loss is even larger than that derived from the calculation of industry benefits and costs. When the range of possible values for key economic variables is considered, the results include the possibility of net gains arising from the allocation alternatives, but the most likely or expected values based on the data scenarios employed resulted in net losses.

Alternative 2 is intended as a proxy establishing the inshore/offshore share allocations at the approximate status quo existing in 1991. The apparent net national losses calculated in the economic analyses results from revised estimates of the respective shares of the two sectors that slightly reduces the inshore share. Based on revised estimates of product recovery rates examined in the analysis, the status quo shares of BSAI pollock TAC in 1991 were approximately 27% inshore and 73% offshore, rather than the 30% inshore, 70% offshore split assumed in Alternative 2. One implication of these calculations is that any allocation to the inshore sector will result in decreased economic efficiency to the nation. Thus, the greater the allocation inshore, as in Alternative 3, the greater the net national loss. These estimates do not account for subsequent changes that may occur in the affected sectors, or any nonlinearities that exist in economic performance beyond the share allocations modeled in the base case 1991 scenario.

In addition to the dollar calculations, the potential impacts on net national impacts of nonmarket factors, primarily pollock discards, is considered as a part of the analysis. To the extent that the discard of pollock reflects private costs that are lower than true social valuation of the resource, the quantitative estimates of aggregate benefits to the nation may be overstated. Moreover, if the divergence between private and social costs exists, and if the offshore discard rate is significantly higher than the comparable inshore rate, the estimates of net economic benefits attributed to the offshore sector will be biased upwards by this difference. Parallel consideration applies to adverse environmental impacts that may be created through discharge of effluence by processing plants.

Results of the cost-benefit analysis emphasize the losses projected to accrue to the offshore sector, and accompanying decrease in national efficiency resulting from preferential allocation to the inshore sector. Such losses must be weighed against the distributive equity, social concerns, and economic development objective sought by the Council in managing the fishery. The Council faces a critical judgment in defining the trade-offs appropriate for the possible allocation of the pollock TAC between these two sectors. The goals adopted by the Council, as well as the framework of the underlying Magnuson Act speak to the multiple objectives sought through management of the fishery. This supplemental analysis provides a fuller accounting of the economic costs and benefits attributable to the proposed alternatives, but cannot prescribe an optimal alternative in the absence of the relative values assignable to the objectives represented.

7.0 LIST OF PREPARERS

Jim Cornelius, Team Leader *	NPFMC, Anchorage
Jerry Berger*	NMFS-NWAFC, Seattle
Steve Freese*	NMFS-NWAFC, Seattle
Jay Ginter*	NMFS-AKR, Juneau
David Hamm *	NMFS-AKR, Juneau
Marcus Hartley*	NPFMC, Anchorage
Jim Hastie*	NMFS-NWAFC, Seattle
Sam Herrick*	NMFS-SWC, LaJolla
Mort Miller *	NMFS, Silver Springs
Russ Nelson *	NMFS-NWAFC, Seattle
Brent Paine *	NPFMC, Anchorage
Galen Tromble *	NMFS-AKR, Juneau
COUNCIL STAFF **	NPFMC, ANCHORAGE

* Sections 1.0 through 6.2
** Sections 8.0 through 8.7

8.0 PREFERRED ALTERNATIVE AND RATIONALE

The North Pacific Fishery Management Council took final action on the Bering Sea/Aleutian Islands inshore/offshore pollock allocation during a meeting held August 3-5, 1992, in Juneau, Alaska. The preferred alternative was developed based on lengthy discussion of the supplementary analysis and revised alternatives, extensive public testimony, as well as recommendations made by the AP and SSC. The preferred alternative adopted by the Council incorporates a percentage share allocation of the BSAI pollock TAC between the inshore and offshore components, along with the designation of a Catcher Vessel Operational Area (CVOA) effective during the pollock "B" season.

The preferred alternative was adopted by a Council vote of 10-1. This majority of Council members, broadly representing all components of the fishing industries of Washington, Oregon, and Alaska, concurred in the Council selection of the preferred allocation scheme as a suitable compromise between taking no action to resolve the preemption problem, and choosing a higher inshore allocation and imposing greater restrictions on the use of the catcher vessel operational area.

8.1 Elements of the Inshore/Offshore Allocation Plan

The Council's preferred alternative constitutes a revision and resubmission of Amendment 18 to the BSAI FMP and has the following elements:

1. The BSAI pollock TAC will be allocated as follows:

Year	Inshore	Offshore
1993	35.0%	65.0%
1994	37.5%	62.5%
1995	37.5%	62.5%

   These percentage allocations apply to the TAC after subtracting 7.5 percent of the TAC for the Western Alaska Community Development Quota program, previously approved by the Secretary for 1992-1995.

2. A Catcher Vessel Operational Area is defined for pollock harvesting and processing during the pollock "B" season (starting on June 1 unless changed), encompassing the area between 168 and 163 degrees W. longitude, and 56 degrees N. latitude south to the Aleutian Islands. The following operational rules apply to the CVOA:

   a. Shore-based catcher vessels delivering pollock from a directed fishery to inshore plants or inshore motherships may operate in the CVOA if an inshore allocation remains unharvested.

   b. Offshore motherships and their associated catcher vessels also may operate in the CVOA if an offshore allocation remains unharvested.

   c. Offshore catcher-processors cannot target on pollock in the CVOA during the "B" season.

   d. Access to the CVOA is unrestricted during the pollock "A" season.

3. If during the fishing year it becomes apparent that either the inshore or offshore sector cannot fully harvest its allocation, the excess shall be released to the other component, without affecting the allocation formula in future periods.

4. The definitions and operating rules approved in the original Amendment 18 remain applicable during 1993-1995, except as revised above.

8.2 Selection of the Preferred Alternative

In selecting its preferred alternative, the Council attempted to address the underlying problem of resource allocation identified in earlier proposed Amendment 18/23, where one industry sector faces preemption by another. Writing to the Council on March 4, 1992, U.S. Department of Commerce Under Secretary for Oceans and Atmosphere John A. Knauss concurred that a preemption problem exists, stating:

" I agree with the Council that a preemption problem also exists between sectors of the industry which have dramatically different capabilities in terms of mobility and harvesting capacity. This is most evident between the smaller, more localized fleets that largely supply onshore processors and the larger, more mobile offshore fleets. The problem is exacerbated by overcapitalization in the industry as a whole and will not be resolved until the Council addresses some form of access control. I agree, however, that in the meantime there is a need to address preemption and other allocation issues while the Council works on a longer term solution."

He went on to note that "...NOAA is not opposed to the concept of an allocation between onshore and offshore interests as an interim measure...[and that]...preventing preemption by one fleet of another, safeguarding capital investments, protecting coastal communities that are dependent on a local fleet, and encouraging fuller utilization of harvested fish are desirable objectives that are provided for under the Magnuson Act."

Under Secretary Knauss partially disapproved the Council's earlier proposal for the Bering Sea and Aleutians after considering a cost-benefit study provided by the National Marine Fisheries Service. He called on the Council to "... examine and refine the assumptions and methodology of the NMFS economic review. The Council may wish to identify countervailing benefits, modify the allocation percentages to minimize economic loss, if necessary, and/or meld a subsequent allocation proposal with a moratorium on entry into the groundfish fisheries."

The Council has responded to all three requests from Under Secretary Knauss in selecting its preferred alternative. As will be discussed below, the Council remains uneasy about the earlier and current cost-benefit results showing a net loss to the nation of an inshore allocation. Nonetheless, the Council modified the allocation percentages to mitigate perceived economic losses, and identified substantial countervailing benefits. Further, the Council approved a moratorium on new entries to the groundfish fisheries, halibut, and Bering Sea and Aleutian Island crab fisheries at their June 1992 meeting. It will be implemented, if approved by the Secretary, sometime in early 1993, for three years. The Council also has moved forward on limiting entry by approving for Secretarial review an individual fishing quota system for halibut and sablefish fixed gear fisheries to be implemented in 1994, and by moving ahead to examine limited entry alternatives for the groundfish and crab fisheries.

The Council rejected the status quo. Alternative 1, the "no action" option, was rejected because it failed to address, even minimally, the identified problems concerning preemption, economic stability, and allocation conflicts represented in the inshore/offshore dilemma. While the magnitude and implications of the inshore/offshore problem remain in dispute, few would deny that an allocation conflict exists among the affected parties. The status quo is associated with the destabilizing impacts of overcapitalization and the accompanying race for fish, recognized as a strategic, underlying cause of the preemption problem. Status quo would maintain management of the fishery under the present first-come, first-served conditions that are not expected to offer any resolution to the preemption issue. Dedicated allocations to the inshore sector are viewed as a means of stabilizing the flow of pollock to both components.

In selecting between Alternatives 2 and 3, the Council addressed the root of the inshore/offshore allocation controversy; that is, the magnitude of a preferential inshore allocation appropriate to equitably resolve the preemption threat faced by the shore-based operations. Alternative 2 represented an allocation intended to freeze respective allocation shares at approximately their current levels. Presumably, no further preemption of inshore access to the pollock fishery could occur, although it is debatable whether current shares of the pollock TAC are consistent with historic or intended future participation in the fishery by the inshore and offshore components represented.

Alternative 3, in comparison, offered a preferential allocation of the available TAC to the inshore sector, increasing in increments of 5%, from 35% to 45% over the next three years. The increase was intended to ensure that the inshore sector had access to the pollock resource and to facilitate the intended development and economic stability of the Bering Sea/Aleutian Islands communities dependent upon inshore catching and processing operations. The preferential allocation comes at a direct cost to the offshore sector, however, in that these operations would receive a reduced allocation from their present level in order to facilitate future increases in the inshore share. Alternative 3 was the same allocation developed in June 1991 by the Council in their original Amendment 18/23 inshore/offshore allocation recommendations to the Secretary of Commerce.

The preferred alternative represents a compromise between Alternatives 2 and 3, balancing the economic and social implications of either extreme. While this recommended allocation scheme may not represent a uniformly agreeable settlement for everyone, it addresses the preemption and community development concerns raised by the inshore sector, without imposing potentially disruptive economic costs on the offshore sector specifically, or the economy in general.

8.3 Economic Benefits and Costs to the Nation

The NMFS benefit-cost analysis presented to the Under Secretary earlier this year concluded that the nation would lose $181 million as a result of the allocations proposed by amendment 18/23 for the Gulf of Alaska and Bering Sea and Aleutians for 1992-1995. These results, and the assumptions and data on which they rest were disputed by industry, and the analytical team was requested to perform a new study on just the Bering Sea - Aleutian Islands allocations proposed in alternatives 2 and 3 of the revised proposal using information available from NMFS and from industry. The new studies concluded there would be losses ranging from $16.7 to $22 million (alternative 2), or $69.8 to $85.8 million (alternative 3), depending on the data and assumptions used. These totals include the loss to vessels and plants, as well as an estimated loss to share-based labor. Losses for vessels/plants alone were estimated to range from $11.3 to $17.2 million (Alternative 2), or $47.2 to $66.8 million (Alternative 3).

8.3.1 Benefit-Cost Model Results of Preferred Alternative

The Council's preferred allocations of 35%, 37.5% and 37.5% (inshore) for 1993, 1994, and 1995, produce intermediate losses according to the model. Table 8.1 summarizes the estimates of net producer surplus incorporating rents received by vessels and plants, combining salient elements of Tables 2.10 through 2.13 from Chapter 2. Column D reports the net present value of total net producer surplus, and column E estimates net national impacts, the latter adjusted for payments to foreign interests.

Parallel results are presented for two alternative data scenarios; 1) the NMFS/analytical team estimates;

and 2) Industry-supplied estimates. The net producer surplus estimates capture rents accruing to vessels and plants only; the previous calculations incorporating an imputed return to share-based labor were dropped at the recommendation of the SSC.

Table 8.1 **Summary Net Producer Surplus Estimates, Plants and Vessels Only, by Data Scenario; Preferred Alternative Allocation**

Data Scenario	Allocation				
	A	B	C	D	E
	1993	1994	1995	NPV	NPV
	35/65	37.5/62.5	37.5/62.5	Total	U.S.
NMFS/Team					
Inshore	$32.0	$41.9	$41.9	$104.7	$50.8
Offshore	($42.3)	($55.5)	($55.5)	($138.7)	($104.0)
Net	($10.4)	($13.6)	($13.6)	($34.0)	($53.2)
Industry					
Inshore	$35.9	$47.5	$47.5	$118.2	$55.0
Offshore	($46.7)	($61.9)	($61.9)	($154.0)	($115.5)
Net	($10.9)	($14.4)	($14.4)	($35.8)	($60.5)

Aside from the inshore/offshore allocation shares, the underlying data and model assumptions used in estimating Table 8.1 are the same as those reported in Chapter 2, with two changes. First, the procedure for calculating inshore plant discards was modified to correct for an error in the original data. This change adds approximately 7,400 tons of plant discards to the inshore calculations, the impact of which is to slightly increase the base share allocation by about 0.5% of the pollock TAC. The effect of this change on the calculated net results reported in Table 8.1 is very minor; a small increase in inshore benefits due to a higher base allocation is nearly offset by a slight decline in benefits due to a very small reduction in the inshore product retention rate.

The second data input change in the benefit-cost analysis is a respecification of certain product prices. An ongoing effort by the analytical team to check and verify data assumptions revealed some problems in the reported pollock product price data. These errors were corrected in this final preferred alternative version of the benefit-cost model. The revised price data are reported in Table 8.2, with changed prices noted in *italics*. These values can be compared to the prior price data assumptions in Table 1.1.

Table 8.2 1991 Bering Sea and Aleutian Island Processed Pollock Price Estimates ($/lb)

Sector/Product	NMFS Scenario		Industry Scenario	
	average price	standard deviation	average price	standard deviation
Offshore				
Roe	$4.68	$0.93	$4.87	$0.93
Fillets s/b	$1.32	$0.30	$1.42	$0.30
Surimi	$1.56	$0.19	$1.57	$0.19
Mince	$0.72	$0.15	$0.87	$0.15
Meal	$0.25	$0.04	$0.28	$0.04
Inshore				
Roe	$3.79	$0.20	$3.79	$0.20
Fillets s/b	$1.52	$0.23	$1.52	$0.23
Surimi	$1.41	$0.13	$1.47	$0.13
Mince	$0.68	$0.13	$0.68	$0.13
Meal	$0.25	$0.01	$0.25	$0.01

Table 8.1, column D, NPV Total, shows that the modelled loss to the nation is $34.0-35.8 million over the three-year allocation period, down $11-33 million from the loss projected by alternative 3, but still up some $17-24 million from the loss projected by alternative 2, depending which parameter estimates one believes to be correct. In this sense, the preferred alternative represents a compromise between the alternatives and an effort by the Council to decrease perceived costs to the nation and real costs to the offshore component of the industry, but still address the preemption problem. The term "perceived" is used purposely because, as will be explored below, it is not clear to the Council that there would be an overall economic loss to the nation caused by the proposed alternative, given the sensitivity of the model outputs to certain key parameter estimates.

8.3.2 Sensitivity Testing

As noted earlier, many of the model assumptions and parameter estimates have been disputed by industry. Changes in certain key variables can cause wide swings in the modelled results, as shown by sensitivity test results provided to the Council. The test showed how a 10% change in a particular price or product recovery rate (PRR) would change the net benefit loss outcome, other things held constant, based on the July 9, 1992 public review draft of the supplemental analysis.

Tables 8.3 and 8.4 show the sensitivity results when applied to alternatives 2 and 3, using NMFS and industry parameter estimates. For example, increasing the offshore surimi PRR by 10% in the model increases the net loss to the nation by 12.4% (using NMFS values). The $66.8 million loss for vessel/plants in Table 2.10 grows by $8.3 million to a net loss of $75.1 million. Conversely, if the inshore PRR for surimi is increased by 10%, net benefits using NMFS values increase by 14.1% or $9.4 million.

Thus the producer loss is reduced from $66.8 million to $57.4 million.

The tables show that overall, the cost-benefit analysis results are very sensitive to changes in fillet, surimi, and roe parameters, and generally unmoved by changes in mince and meal assumptions. The results also are intuitive. If offshore prices and product recovery rates go up, allocating fish away from that sector leads to a greater net loss. Conversely, if inshore prices and recovery rates go up, there is less of an estimated national loss for each ton allocated inshore.

Table 8.3 Sensitivity of the net producer surplus calculation to changes in product recovery rates and product prices using NMFS parameter estimates.

Product	% Change in Net Producer Surplus Given a 10% increase in:			
	Offshore PRR	Inshore PRR	Offshore Price	Inshore Price
Fillets	-5.9%	4.0%	-7.0%	5.0%
Surimi	-12.4%	14.1%	-13.4%	18.4%
Roe	-7.4%	2.8%	-9.5%	3.1%
Minced	-0.3%	0.0%	-0.4%	0.6%
Meal	-0.2%	0.1%	-0.4%	1.8%

Table 8.4 Sensitivity of the net producer surplus calculation to changes in product recovery rates and product prices using Industry parameter estimates.

Product	% Change in Net Producer Surplus Given a 10% increase in:			
	Offshore PRR	Inshore PRR	Offshore Price	Inshore Price
Fillets	-8.8%	5.2%	-10.3%	6.5%
Surimi	-17.1%	22.0%	-18.4%	27.9%
Roe	-8.5%	3.6%	-11.3%	4.0%
Minced	-0.5%	0.0%	-0.6%	0.7%
Meal	-0.4%	0.1%	-0.5%	2.4%

8.3.3 Estimation of Surimi Product Recovery Rates

Surimi product recovery rates are very vulnerable to mistakes in estimation. They are very difficult, if not impossible to verify, especially for the offshore fleet where until recently, there were few independently verifiable measures of retainable catch. Therefore NMFS has used PRRs developed from a variety of sources. The history of surimi PRR reporting is instructive in this sense to show the variability of the estimates over time, especially in light of the management decisions being made (Table 8.5).

Table 8.5 History of Estimated Surimi Product Recovery Rates

Source	Estimated Surimi PRR (%)	
NRC 1984 and early version of roe stripping study	23	
Later version of Amendment 19/14 using observations from 1989 fisheries	16	
NMFS interim Emergency Rule February 1990	22	
AFTA fleet during roe season	10-15	
Final action on roe stripping in June 1990	15	
1989-1990 OMB survey	13.7 offshore	18 onshore
PRR used in 1992 management	15 offshore	20 onshore
NMFS cost-benefit study - April 1992	18 offshore	20 onshore
NMFS data from six factory trawlers during 1992 "A" season	14.35 offshore	
June 1992 cost-benefit study	17.7 offshore	18.3 onshore

PRRs first came under intense scrutiny in 1989 and 1990 when the Council was considering a ban on roe stripping of pollock. Leading into that study, 23% was thought to be the appropriate surimi-sponsored PRR. This was the value used by Natural Resource Consultants in 1984 in a Council-sponsored study on the economics of the groundfish industry, and that value was used initially in analyzing roe stripping Amendment 19/14 to the groundfish plans.

Though several industry sources indicated that the rate should be lowered to 16% for the roe stripping study, and it was in later versions of the analysis, NMFS studied observer reports from foreign processing vessels during the 1983-1985 pollock roe seasons and estimated the surimi PRR to be 22%, which they published in their interim emergency measure to ban roe stripping in February 1990. In response to that proposed rule, the then Alaska Factory Trawler Association (AFTA) wrote on February 5, 1990 to the Secretary of Commerce, contending that foreign operations had incentive to report higher PRRs because their tallied catch was derived by dividing finished product by the logged PRR. Using overstated PRRs meant they had more quota left to catch. AFTA noted that their own fleet's surimi PRRs during the roe season ranged from 10 to 15%, much lower than the 22% used in the emergency rule.

Based on comments received from industry, NMFS reduced the surimi PRR to 15%, a number accepted by the Council when taking final action on the roe stripping ban amendment in June of 1990. This number was used throughout 1991 to enforce the roe stripping ban.

The OMB survey of onshore and offshore processors for all of 1989 and the first half of 1990 produced an estimate of 13.7% for offshore, which compared well with AFTA's earlier estimates for the offshore fleet, and 18% for onshore components.

For 1992, NMFS used a published surimi PRR of 15% for offshore, and 20% for inshore. NMFS economists used 18% for the offshore sector in their inshore/offshore benefit-cost model, and 20% for the inshore sector, based on an early draft of a proposed rule that NMFS later changed. A subsequent NMFS analysis of six factory trawlers and 51,000 mt of retained pollock during the "A" season in 1992 showed that the offshore surimi PRR was 14.35%, which agreed very well with the OMB survey and the estimate provided by AFTA in early 1990.

In considering the inshore/offshore proposal, the Council was very aware of the history of surimi PRR estimates. Product recovery rates are germane not only to this current inshore/offshore issue, but also to estimates of bycatch rates of prohibited species. The history is recounted here to indicate the variability of the estimates over time and management issue. Recently, NMFS has been working with the offshore fleet to develop methods for directly measuring retained catch and observers are also beginning to report round weight catch which is used to provide a best blend estimate for the observed and unobserved fleet.

Predicting how PRRs will change in the next three years is difficult, but most likely they will increase. For example, a representative of Baader indicated that the Baader machines are capable of producing 20% recovery for surimi and that the newer Baader 212s could achieve up to 23.5-24.5% surimi product recovery. He indicated that they now have orders and reservations to replace about 20% of the 182s with 212s, mainly for processors in the State of Alaska.

At the August 1992 Council meeting, the Council's SSC expressed their concerns over the uncertainty regarding estimates of product recovery rates and their stability over time. The NMFS Regional Director stated that PRRs were very difficult to estimate, and several Council members expressed very strongly their uneasiness with the sensitivity of the model and its results to these underlying data.

8.3.4 Other Sources of Uncertainty

There are other sources of uncertainty that were debated by industry and the Council in interpreting the cost-benefit results. Roe prices and product mixes were one area of concern. The analysts assumed a differential between roe product mixes between the inshore and offshore components, assigning a higher proportion to the offshore fleet. Compelling arguments were given during Council discussion that recoveries of roe will probably be the same for both the offshore and inshore fleet for 1993-1995 now that the Bogoslof area is closed and the offshore fleet will be able to access the Catcher Vessel Operational Area during the pollock "A" season. There was evidence presented that roe recoveries were similar between the two components in 1992 with the closure of Bogoslof.

Another source of uncertainty in the model results is the price estimates. Prices play an important role in determining the modeled outputs especially for surimi, roe and fillets (Tables 8.3 and 8.4). Surimi prices increased greatly between 1990 and 1991. The SSC noted that current prices may not be an accurate forecast of prices in 1993-1995 and that changes in markets for pollock products could alter relative prices and change the estimates of cost and benefits. They also found pollock roe prices to be overstated by 15% due to a reporting error. These and other prices were updated in producing Tables 8.1 and 8.2.

Other concerns included the derivation of non-labor variable costs for the offshore fleet and their significant divergence from cost data gathered during the OMB survey, the lack of a monetary cost explicitly assigned to discards, and no accounting for the benefits accruing to the U.S. from taxes paid by foreign firms with interests in the fishing and processing industry. The SSC noted that the procedures used by the team understates the domestic benefit of foreign ownership to the extent that foreign firms pay U.S. income taxes, but to correct this would require substantially more detailed tax and accounting information than was available. The producer surpluses shown in Table 8.1, column E, have not been adjusted to reflect the benefits of taxes paid by foreign interests. Additionally, there were compelling arguments made in public testimony from resource economists that taxes, from whatever source, should be treated as a benefit to society, not a cost, because a public resource was being used. They noted that corporate profits are not a surrogate for the broader goals of the Magnuson Act.

8.3.5 Benefit-Cost Uncertainties

The uncertainties in the model and its results were weighed by the Council and its advisory groups. The Advisory Panel concluded that the analysis was flawed because of various erroneous assumptions and inputs, but stated they had no way of verifying which were correct. The Scientific and Statistical Committee noted that the variation associated with the model inputs remained uncertain, which implied that the probability of positive net national benefits may not be accurately estimated. Further, they recognized that the data for the analysis was drawn from a single year's experience in a rapidly evolving industry and that the model may therefore not accurately depict the distribution of benefits likely to occur in future years. The SSC concluded, however, that the data indicate that net benefits associated with alternatives 2 and 3 were likely to be negative, and the impacts of each of the alternatives on aggregate income and employment were likely also to be negative.

The Council, however, heard compelling arguments to the contrary. During the Council meeting, the inshore industry provided an example of how the outputs of the model could vary widely with relatively small changes in the assumptions and input parameters. They showed that by using surimi PRRs and non-labor variable costs based on OMB survey estimates, by assuming equal pollock roe recovery rates, and by correcting a documentable mistake in the amount of primary shoreplant production going to meal, the net national loss of $66.8 million for vessel and plant would be reversed to a net national gain of almost $23 million for alternative 2, using the NMFS estimates for the other values in the model.

To give an example of how these types of changes could affect the current preferred alternative modelled results, a third run of the model is shown in Table 8.6. The "Testimony" scenario is a modification of the NMFS/Team estimates incorporating three changes presented to the Council: 1) equalization between the inshore and offshore sectors of the roe recovery rate/product mix from total catch at 1.72% ; 2) a downward revision in the offshore pollock product recovery rate from 17.7% to 14.0%; and 3) an upward revision in offshore variable costs calculated directly from the cost profiles generated from the OMB groundfish survey. These changes would help address some of the concerns raised above.

Table 8.6 Net Producer Surplus Estimates, Plants and Vessels Only; Preferred Alternative Allocation; Based on Changes Recommended in Public Testimony.

Data Scenario	Allocation				
	A	B	C	D	E
	1993	1994	1995	NPV	NPV
	35/65	37.5/62.5	37.5/62.5	Total	U.S.
Testimony					
Inshore	$49.1	$61.4	$61.4	$155.4	$71.5
Offshore	($45.4)	($56.8)	($56.8)	($143.7)	($107.8)
Net	$3.7	$4.6	$4.6	$11.6	($36.3)

In this example, the cumulative effect of these changes results in a significant improvement in the estimated efficiency of the inshore sector, relative to the offshore sector, as reflected in the positive net surplus gain of $11.6 million. The example shows how sensitive the benefit-cost results are to changes in the underlying data and model assumptions. Within the range of data values assumed for the model, it was demonstrated that positive net benefits could result even under the NMFS and Industry data scenarios for the results reported in Table 8.2.

8.4 Economic Impact Model Results

The preferred alternative inshore/offshore allocation shares and modification to the data scenario assumptions employed in the benefit-cost analysis were also applied to the economic impact model. The distributional impacts on direct income by location are illustrated in Figure 8.1; comparable estimates of FTE employment are shown in Figure 8.2. These distributions reflect the cumulative economic impacts that might accrue over time based on the three-year allocation scheme represented in the preferred alternative.

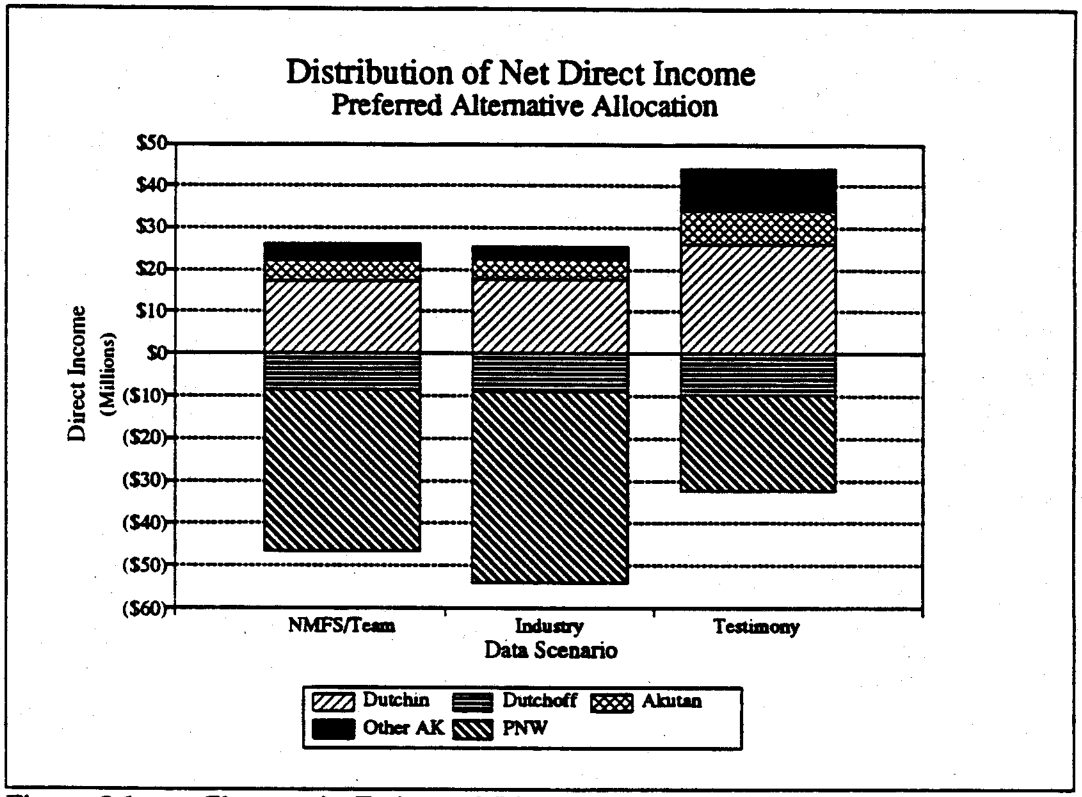

Figure 8.1 Changes in Estimated Direct Income by Location, by Data Scenario; Preferred Alternative Allocation

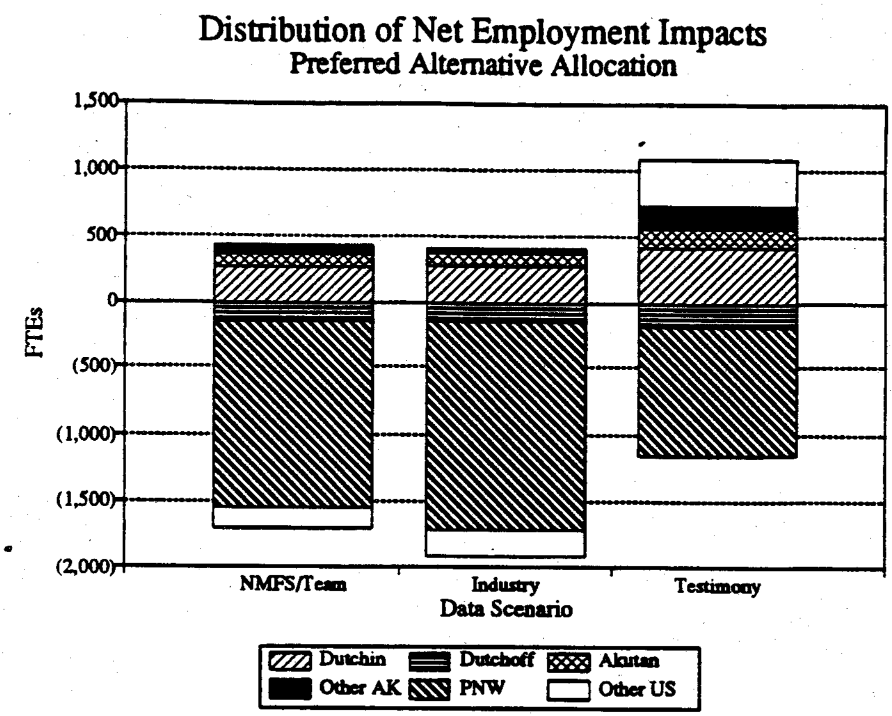

Figure 8.2 **Distribution of Net Employment Impacts by Location, by Data Scenario; Preferred Alternative Allocation**

Table 8.7 reports these cumulative three-year impacts for the inshore and offshore sectors based on the locations analyzed. Generally, direct incomes increase in the inshore communities and Alaska in general, but these gains variously are offset by losses in income in the Pacific Northwest that are dependent upon the offshore sector. The preferred alternative would generate from approximately 450 to 750 additional FTEs in the inshore sector, covering direct, indirect, and induced employment nationwide, at the expense of 1,200 to 1700 FTEs in the parallel offshore sector.

Table 8.7 **Cumulative Direct Income and Employment Impact Estimates by Data Scenario; Preferred Alternative Allocation**

Data Scenario	Inshore Sector		Offshore Sector		Cumulative[a]	
	Income	FTEs	Income	FTEs	Income	FTEs
NMFS/Team	$26,493,707	442	($47,482,590)	(1,571)	($20,988,883)	(1,304)
Industry	$26,034,697	428	($54,537,433)	(1,738)	($28,502,745)	(1,536)
Testimony	$44,611,918	755	($32,994,845)	(1,173)	$11,617,073	(66)

[a] Cumulative impacts are not necessarily the simple difference between the values estimated for the inshore and offshore locations due to some offsetting impacts between the two sectors in specific locations, as well as differences in wage rates used to define FTEs.

The net impact is an estimated loss in FTEs after accounting for offsetting impacts in locations common to both sectors. The loss in FTEs ranges from less than 100 FTEs using the Public Testimony scenario, to in excess of 1,500 FTEs based on the Industry scenario. These employment estimates are based on total economic activity generated in a given location. The indicated net loss in employment under the NMFS and Industry scenarios is consistent with the net losses in direct incomes, in that the foregone direct income and associated indirect and induced economic activity represents lost jobs and employment, as well. For the Testimony scenario, a net decline in FTE's is estimated, despite an increase in direct incomes. The net decline in FTEs in this latter case illustrates the role of wage rates in determining total employment. Because the average wage is higher in Alaska (where much of the inshore employment occurs) compared to wages in the PNW, it requires proportionately more economic activity in Alaska to support the same number of FTEs. Thus, even though direct income is higher, net FTEs may decline to the extent a larger number of lower wage FTEs are displaced elsewhere.

8.5 Impact of the Catcher Vessel Operational Area

The intent of the CVOA is to provide some protection or stability to the fishing grounds adjacent to the major shore-based processing plants in order to ensure that the inshore sector will have pollock stocks available to meet the inshore allocation. The preferred inshore-offshore alternative represents a compromise between an exclusive, year-round CVOA, and no designated area at all.

The offshore sector is permitted access to the CVOA during the "A" season. This is less restrictive than the Council's original proposal in Amendment 18/23 which was to allow the offshore fleet to take no more than 65% of its "A" season quota in the CVOA. It is much less restrictive than the option analyzed in the supplementary analysis which would have prohibited offshore access to the CVOA altogether.

The Council compromised on this less restrictive provision because of compelling testimony by representatives of the offshore fleet. The offshore representatives claimed that closing the CVOA during the "A" season would deprive them of prime fishing grounds on the largest roe-bearing fish, particularly since the Bogoslof fishery had been closed. Further, the presence of the ice edge would concentrate factory trawlers with other gear types using longlines and pots, thus causing congestion and gear conflicts. Moving factory trawlers north of 56 degrees North would result in lower recovery rates and higher discard of small pollock, and could have bycatch implications.

The Council also chose to allow offshore motherships to operate in the zone so long as offshore quota remained unharvested. This is less restrictive than the 1992 provision and is based on testimony from the catcher boat fleet that safety is a prime concern, especially during the winter when the combination of ice edge, icing conditions, and severe storms make it very hazardous to operate outside the CVOA.

The Council restricted the offshore catcher-processor fleet from the CVOA during the "B" season because the pollock would have dispersed and would be available elsewhere. Large boat effort concentrated n the CVOA during the summer could depress local concentrations of pollock and foreclose opportunities for the inshore fleet to attain its quota. This restriction also will reduce conflicts between small and large boats that have different operating characteristics and requirements.

Assuming that the split between the 'A' and 'B' seasons were to remain the same as in 1992, Table 8.8 reports the potential removals from the CVOA in 1993, 1994, and 1995. These projections are based on landings of 1,251,155 mt of pollock; the 1992 TAC of 1,352,600 mt adjusted for a 7.5% CDQ allocation. The potential removals assume that all pollock allocated to the inshore sector are taken inside the CVOA, and that offshore mothership operations take 13.25% of the offshore allocation all within the CVOA (the same proportion of the offshore harvest as in 1991). Upper and lower bounds for the offshore catcher/processors (C/P) harvest in the 'A' season reflect the following: 1) the lower bound assumes that

C/Ps harvest none of their 'A' season allocation in the zone; and 2) the upper bound assumes that C/Ps harvest 100% of their 'A' season inside the CVOA.

Table 8.8 Potential Removals From the CVOA; in Metric Tons

Sector	1993 (35% / 65%)	1994/1995 (37.5% / 62.5%)
Inshore Sector	437,904	469,183
Offshore Motherships	107,756	103,611
Offshore C/P: Lower Bound	0	0
Offshore C/P Upper Bound	239,868	230,643
Total Removals: Lower Bound	545,660	572,794
Total Removals: Upper Bound	785,528	803,437

Based on these assumptions, the lower bound removals are higher than levels seen in 1990 and 1991 (see Table 4.1), but lower than removals during peak years with joint venture processing (1986-1989). The upper bound levels represent removals higher than any previous year except 1988. Removals from the CVOA might fall below the indicated bounds to the extent that either motherships or inshore harvest vessels rely upon catch from outside this zone.

The impacts of the partial year CVOA are less certain than a year-round CVOA in the eventuality that the Council chooses to change the seasonal allocation scheme. For example, if the 'A' season TAC were set to zero then the preferred alternative would have the same impacts as a year-round CVOA.

8.6 Social Considerations

The social impact analysis in the original study of Amendment 18/23, and as supplemented in the current analysis, concluded there would be positive social gains from an inshore allocation of pollock, and that social benefits to inshore operations may arise from increased or stabilized incomes, employment, and related economic activity, and simply from reductions in the uncertainty, or threat of preemption that accompanies a set allocation. Only in the short term, and in extreme situations where substantial allocations of TAC are made to the inshore sector, would community infrastructure be incapable of accommodating the pressure on social services.

In developing its preferred alternative for resubmission to the Secretary, the Council heard considerable public testimony from industry and related interests on the potential social impacts of the proposed allocations. Representatives of communities from Western Alaska testified on the benefits that would be generated from an inshore allocation. An inshore allocation would stabilize municipal and community revenues to finance schools, water, sewer and solid waste facilities, ports and harbors, and medical facilities, especially in light of declining oil-based revenues.

The inshore pollock industry in 1992 alone will generate about $7 million in municipal, borough, and state taxes, all important to regional developments and infrastructure. For example, the City of Unalaska generates $14 million in general fund revenues annually, and fisheries taxes or related property taxes provide 52% of that revenue base. In the Aleutians East Borough in FY 1991, groundfish processing in Akutan provided $1,072,632 or 37% of the Borough's total sales/use tax revenues. The proceeds helped fund medical, education, and capital projects throughout the Borough in Cold Bay, King Cove, Nelson Lagoon, and Sand Point. Deliveries and processing at Akutan support a year round work force and provided funds for improving docks, warehouses, and air service. In the Pribilofs, inshore processing of crab now provides 24-26% of the total revenues in St. George, and more processing opportunity would greatly improve the economy, especially since fur seals can no longer be harvested. St. Paul testified that CDQs will not be sufficient, and that more processing and involvement in the industry are needed to increase their economic well-being.

The offshore sector also provides major economic support to the Western Alaska region in the form of direct employment, local expenditure, and various taxes. Through the Bering Sea Commercial Fisheries Development Foundation, which is funded through a voluntary tax paid by each member of the American Factory Trawler Association, 44 Western Alaskans, mostly from economically disadvantaged communities, have been employed with factory trawler companies. These workers come from such places as Alakanuk, Bethel, Chevak, Ekwok, Emmunak, and nine other communities where alternative employment opportunities are extremely limited. The number of workers could double as more are trained. The Foundation generated some $1 million for use as seed money for development projects in Western Alaska to increase economic well-being. The offshore sector testified that it contributed about $103 million in 1990 to the local Unalaska/Dutch harbor economy in payroll and non-payroll expenditures.

Overall, both the inshore and offshore sectors contribute to the economies of Western Alaska. But the preponderance of testimony by representatives of local communities indicated that they supported a continued inshore/offshore allocation because it would clearly benefit Alaska coastal communities in the short term and would provide community stability in the long-term. There would be a more stable flow of municipal and state revenues, as opposed to the current economic peaks and valleys, and locally managed and owned support businesses would operate evenly throughout the year to serve processors, their workers, and their fleets. An expanded market would be available to fishermen for processing traditional species. There would be continued integration and permanent residency of processing and management personnel and their families. Employment opportunities for local residents would continue to improve. Longer-term decision-making and planning would occur which would facilitate financing of sorely-needed infrastructure.

The Council recognizes that there will be losses to the offshore industry as a result of the preferred alternative allocations. For example, one factory trawler representative testified that his company would have to reduce full-time employment by about 50 people out of 141 as a result of the allocation. These and other employment changes likely will occur in the offshore sector. However, the Council believes that these losses will be more easily absorbed in the greater Seattle economy than losses that may be imposed on the local Alaska inshore sector economies if the preemption problem is not addressed. To illustrate, the offshore sector employs about 0.3 percent of the Seattle workforce, if it is assumed that all employees come from that area. In contrast the seafood processing industry is about 49% of total employment and 65% of private employment in the Aleutians area. In the greater Seattle area, that would be equivalent to 555,000 people directly employed in seafood processing, which is equivalent to nearly five times the total Washington statewide employment in the aircraft industry. The seafood processing industry thus is nearly five times as important to the Aleutians area as the aircraft industry is to the greater Seattle area of King and Snohomish Counties.

8.7 Conclusion

Both the inshore and offshore sectors of the Alaska groundfish industry have experienced explosive growth in the last few years, and the preferred alternative is an interim measure to manage the allocation conflicts and sectoral preemption problems that have developed between the domestic inshore and offshore components of the pollock fishery in the Bering Sea and Aleutian Islands. As stressed in the original

SEIS, the situation and problem are rooted in an overcapitalization dilemma for which there is no apparent simple solution. The absence of recognizable property or access rights in the affected fishery, fueled by conditions of open access under the Olympic system have created conditions of excess capacity that have now spilled over into serious allocation conflicts among the various catching and processing interests represented. This situation threatens to evolve into a destructively competitive environment that could jeopardize the economic and biological stability of the fishery resources involved.

The revised alternatives considered by the Council offered a condensed range of options, based on issues raised by the Commerce Department in their partial approval of Amendment 18 in March 1992. The Council's preferred alternative is a variation of the basic plan originally adopted in June 1991; separate allocations of the pollock TAC to defined inshore and offshore components, combined with a designated operational area around the inshore processing ports at Dutch Harbor and Akutan. This action creates separate catch quotas for the two components, as well as partially separate operational areas. The preferred alternative is intended to provide a more stabilized operating environment conducive to community and economic development, as well as prevent a further deterioration of the working and competitive relationships that exist within the industry.

The supplementary analysis, along with public comment submitted to the Council, documents that operating stability and preemptive relief granted to the inshore sector comes at a direct cost to the offshore sector. As a result, the Council has sought to weigh the various dimensions of inshore gains against resulting offshore losses that might arise through corrective management action. The supplementary analysis provides a systematic examination of costs, benefits, and related economic impacts projected to occur under the allocation alternative, compared to the status quo. The data and model parameters employed in the estimation procedure show that a preferential allocation to the inshore sector is likely to impose a net national economic cost. However, the magnitude and probability of economic benefits and costs remains the subject of great controversy. A relatively small change in some of the key inputs to the benefit-cost model can cause major differences in the estimates of net national loss or benefit. The analysis has illustrated those dimensions of the industry that determine relative economic efficiency and equity, and the associated variables that might be monitored in ongoing or future analyses of economic performance.

There are national benefits associated with maintaining a balance in the social and economic opportunities inherent in these fisheries. Restricting or managing preemption helps ensure that the fishery resources are available to provide benefits to all parties, without unduly obstructing the competitive element of the marketplace. The assignment of set harvest shares of allocations is expected to reduce the uncertainty and operational instability caused by actual or threatened preemption.

Social impact considerations indicate that only in the short-term and in extreme situations where substantial allocations of TAC are made to the inshore sector, would community infrastructure be incapable of accommodating the pressure on social services. In most cases, Alaska communities would welcome the economic input into their area associated with a preferential inshore allocation. An increase in Alaska employment would effect a proportionally larger decrease in employment in the Pacific Northwest due to a lower cost of living and lower wages in Washington and Oregon, relative to Alaska. However, there is evidence that the Pacific Northwest communities can more easily absorb this loss of employment into other industries.

The allocation percentages developed in the preferred alternative represent the balance or compromise between the inshore and offshore sectors intended to achieve an equitable apportionment of the pollock resource without needlessly penalizing the equity or efficiency of either component. The sector allocations are not expected to result in permanent solutions to the preemption problem, and are likely to be eroded over time by subsequent preemption within the respective sectors. The vessel moratorium amendment proposed by the Council may slow this process, or prevent a worsening of the overcapitalization problem, but the pollock catching and processing industry already has excess capacity, so competitive pressures are expected to resurface. The preferred alternative represents an interim management action to prevent a worsening of the situation while a comprehensive solution to the overcapitalization problem and related allocation conflicts is being developed.

In summary, the Council believes it is to the benefit of the nation to address the preemption problem by allocating between the competing sectors. The adjustments in the pollock available to the two sectors will provide a suitable harvest resource base for each sector over the next three years while the Council develops a comprehensive plan to rationalize the fisheries, equitably and responsibly. While developing the plan, a major social consideration of the Council is that there needs to be stability and protection of local communities and smaller fishing operations in the face of a highly mobile preemptive fleet. Having considered the analysis and supporting information, and extensive public testimony on both sides of the issue, the Council believes this allocation plan is in the best interest of the United States.

Options for revised Amendment 18

Items to be considered: Years (1993-1995), Season (A & B), CVOA

Main Options:

1) Total disapproval, no allocation or Catcher Vessel Operational Area (CVOA)

2) Total approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 with the CVOA

3) Approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 without the CVOA

4) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 with the CVOA

5) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 without the CVOA

6) Disapproval of allocations for 1993-95 with approval of CVOA only

7) Total approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 only during A season with the CVOA

8) Approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 only during A season without the CVOA

9) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 only during A season with the CVOA

10) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 only during A season without the CVOA

11) Total approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 only during B season with the CVOA

12) Approval of 35/65 split for 1993 and 37.5/62.5 split for 1994-95 only during B season without the CVOA

13) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 only during B season with the CVOA

14) Approval of 35/65 split for 1993 and disapproval of 37.5/62.5 split for 1994-95 only during B season without the CVOA

Comparison of Proposed Allocations for Amendment 18 and revised Amendment 18:

	1992	1993	1994/95
A (roe) season	No allocation	35/65	37.5/62.5
B (non-roe) season	35/65	35/65	37.5/62.5
CVOA	B-Season only Catchers only	B-Season only Catchers/ motherships (incl. offshore)	B-Season only Catchers/ motherships (incl. off)
CDQ	B-Season	Year-round	Year-round

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

MEMORANDUM FOR: Distribution*

FROM: for Joe P. Clem Donald J. Leedy
Chief, Plans and Regulations Division

SUBJECT: Amendment 18 to the FMP for the Groundfish of the Fishery of the Bering Sea and Aleutian Islands (BSAI) Area

Attached is a copy of the subject amendment and the associated Regulatory Impact Review\initial Regulatory Flexibility Analysis prepared by the North Pacific Fishery Management Council for formal review under the Magnuson Fishery Conservation and Management Act.

The amendment allocates pollock in the BSAI between the inshore and offshore components at the following percentages:

	Inshore	Offshore
1993	35 %	65 %
1994-95	37.5 %	62.5 %

In addition, the amendment establishes a Catcher Vessel Operational Area in the BSAI that would prohibit the offshore component from operating within the designated area during the non-roe (or "B") season (June 1-December 31) effective through December 31, 1995.

This package is a submission of a previously disapproved amendment and is on a 60-day fast track schedule, therefore, we are requesting that you provide your comments (including "no comments") by October 20, 1992. If you have any questions, call Diane Bowen at 301/713-2343.

Attachments

*Distribution

F/CM
F/CM1 - Fricke
F/CM2 - Clem, Hooker
F/CM3 - Magill
F/EN - Pallozzi
GCF - Rogerson
GCEL - Kuruc
Fx3 - Sissenwine
F/PR2 - Kaufman
F/PR3 - Hall
CS/EC - Cottingham
N/ORM4 - Burgess
GC - Johnson
OGC - Malone

[1] From: Peter Fricke at ~NMFS-FCM 11/16/92 4:13PM (1503 bytes: 22 ln)
To: Richard Schaefer
cc: Morton Miller at ~NMFS-3Com, David Crestin, Joe Clem, Fred Bilik,
Richard Surdi, Peter Fricke
Subject: Amendment 18 briefing for Knauss, 11/17/92

------------------------------ Message Contents ------------------------------

Becky Rootes, on Knauss' staff, called me this afternoon to ask about the social and economic impact assessments; she has the task of pulling together Knauss' decision materials. She asked a number of questions and made a number of points...

a) last Friday's briefing was not focussed and did not meet Knauss' needs;
b) Knauss wants to know the following...
  - o what is NMFS' position vis-a-vis revised #18?
  - o what conservation goals would be met or endangered by approval or disapproval?
  - o what changes in the structure of the fishery would occur if the amendment were disapproved?
  - o what is F/CM's position on approvability of the amendment?
  - o what are the likely outcomes of the allocation on each sector of the fishery (factory-trawlers, independents/mother-ship operations, inshore catcher vessels, third-fleet, processors)?
  - o who will benefit economically now and in five years?
  - o who will benefit socially now and in five years?

c) If Knauss disapproves #18....
  - o what action will NMFS take to deal with the allocation issue?
  - o what message should be sent to the Council if the amendment is disapproved?

LEAKAGE OF BENEFITS TO OTHER COMPANIES

COMPARISON OF 92 + 93

SOCIAL ISSUES + IMPACT

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Amendment 18 Inshore/Offshore Pollock Allocation

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SUMMARY TABLE

Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred and Modified Preferred Alternative Allocation, Showing Net Present Value Over Life of Program (1993-1995) of Total Surplus Gains/(Losses) and Gains/(Losses) for U.S. Interests Only[1]

(Dollars in Millions)

Assumptions		NPV TOTAL	NPV U.S.	Prob. %		Ref.
OSRR[2]	ARRR[3]			+	(-)	
Allocation Full Year[4]						
17.7%	1.7%/.7%	($ 48.0)	($ 54.6)	5.6	94.4	Tbl. 1
14.0%	1.5%/1.2%	($ 20.0)	($ 44.9)	28.8	71.2	Tbl. 1a
14.0%	Equalized	($ 11.1)	($ 40.4)	38.1	61.7	Tbl. 2
16.0%	Equalized	($ 17.6)	($ 41.9)	31.2	68.8	Tbl. 3
18.0%	Equalized	($ 22.5)	($ 42.1)	23.3	76.7	Tbl. 4
Allocation "B" Season Only						
14.0%	No roe	($ 9.3)	($ 22.1)	32.1	67.9	Tbl. 5
16.0%	No roe	($ 13.7)	($ 23.1)	23.3	76.7	Tbl. 6
18.0%	No roe	($ 16.5)	($ 23.5)	16.1	83.9	Tbl. 7
Allocation "A" Season Only						
14.0%	Equalized	($ 0.7)	($ 18.3)	49.9	50.1	Tbl. 5a
16.0%	Equalized	($ 3.9)	($ 18.8)	42.2	57.7	Tbl. 6a
18.0%	Equalized	($ 6.0)	($ 18.8)	38.4	61.6	Tbl. 7a

[1]Proposed "preferred" allocations for 1993 through 1995 are as follows: 1993 - 35% inshore, 65% offshore; 1994 and 1995 - 37.5% inshore, 62.5% offshore.

[2]Offshore Surimi Recovery Rate

[3]Ancillary Roe Recovery Rate

[4]Shaded areas indicate "most likely scenarios based on recent industry performance.

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Table 1. Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **17.7%** offshore surimi recovery rate (expected value).
(2) Ancillary roe recovery: **1.72%** offshore; **0.68%** inshore.
(3) **Allocations in effect full year.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF %	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 7.2	$ 9.5	$ 9.5	$ 23.6	
Crew	3.4	4.4	4.4	11.0	
Plant	24.7	32.4	32.4	81.0	
TOTAL	**$ 35.3**	**$ 46.3**	**$ 46.3**	**$115.7**	**$ 49.7**
OFFSHORE:					
Vessel	($ 42.5)	($ 55.7)	($ 55.7)	($139.1)	
Crew	(7.5)	(9.9)	(9.9)	(24.7)	
TOTAL	**($ 50.0)**	**($ 65.6)**	**($ 65.6)**	**($163.8)**	**($104.3)**
NET:					
Vsl/plant	($ 10.5)	($ 13.8)	($ 13.8)	($ 34.4)	
Crew	(4.2)	(5.5)	(5.5)	(13.6)	
TOTAL[2]	**($ 14.7)**	**($ 19.3)**	**($ 19.3)**	**($ 48.0)**	**($ 54.6)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 5.6%; Negative, 94.4%

Table 1a. Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **14.0%** offshore surimi recovery rate (determined value) per 1992 results in "A" season.
(2) Ancillary roe recovery: **1.48%** offshore; **1.17%** inshore per 1992 results.
(3) Base year harvest: inshore-30%; offshore-70%.
(4) **Allocations in effect full year.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF %	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.** [1]
INSHORE:					
Vessel	$ 9.3	$ 11.6	$ 11.6	$ 29.4	
Crew	4.3	5.4	5.4	13.7	
Plant	36.8	45.7	45.7	115.9	
TOTAL	**$ 50.4**	**$ 62.6**	**$ 62.6**	**$158.9**	**$ 69.0**
OFFSHORE:					
Vessel	($ 48.2)	($ 59.9)	($ 59.9)	($151.9)	
Crew	(8.6)	(10.6)	(10.6)	(27.0)	
TOTAL	**($ 56.8)**	**($ 70.5)**	**($ 70.5)**	**($178.9)**	**($113.9)**
NET:					
Vsl/plant	($ 2.1)	($ 2.6)	($ 2.6)	($ 6.7)	
Crew	(4.2)	(5.2)	(5.2)	(13.3)	
TOTAL [2]	**($ 6.3)**	**($ 7.9)**	**($ 7.9)**	**($ 20.0)**	**($ 44.9)**

[1] Does not include taxes paid to U.S. by foreign entities.

[2] Probability: Positive, 28.8%; Negative, 71.2%

Table 2. Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **14.0%** offshore surimi recovery rate (determined value).
(2) Ancillary roe recovery: **1.52%** offshore; **1.52%** inshore.
(3) **Allocations in effect full year.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF %	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 9.3	$ 11.6	$ 11.6	$ 29.4	
Crew	4.3	6.4	6.4	13.7	
Plant	40.3	50.0	50.0	125.9	
TOTAL	**$ 53.9**	**$ 67.0**	**$ 67.0**	**$169.0**	**$ 74.2**
OFFSHORE:					
Vessel	($ 48.5)	($ 60.2)	($ 60.2)	($152.9)	
Crew	(8.5)	(10.7)	(10.7)	(27.2)	
TOTAL	**($ 57.0)**	**($ 70.9)**	**($ 70.9)**	**($180.1)**	**($114.6)**
NET:					
Vsl/plant	($ 10.5)	($ 13.8)	($ 13.8)	($ 34.4)	
Crew	(4.2)	(5.5)	(5.5)	(13.6)	
TOTAL[2]	**($ 3.1)**	**($ 3.9)**	**($ 3.9)**	**($ 11.1)**	**($ 40.4)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 38.3%; Negative, 61.7%

Table 3. Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **16.0%** offshore surimi recovery rate (determined value).
(2) Ancillary roe recovery: **1.63%** offshore; **1.63%** inshore.
(3) **Allocations in effect full year.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF %	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 8.1	$ 10.4	$ 10.4	$ 26.0	
Crew	3.8	4.8	4.8	12.2	
Plant	36.0	46.0	46.0	115.8	
TOTAL	**$ 47.9**	**$ 61.2**	**$ 61.2**	**$154.0**	**$ 67.4**
OFFSHORE:					
Vessel	($ 45.3)	($ 57.9)	($ 57.9)	($145.7)	
Crew	(8.1)	(10.3)	(10.3)	(25.9)	
TOTAL	**($ 53.4)**	**($ 68.2)**	**($ 68.2)**	**($171.6)**	**($109.3)**
NET:					
Vsl/plant	($ 1.2)	($ 1.5)	($ 1.5)	($ 3.8)	
Crew	(4.3)	(5.5)	(5.5)	(13.7)	
TOTAL[2]	**($ 5.5)**	**($ 7.0)**	**($ 7.0)**	**($ 17.6)**	**($ 41.9)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 31.2%; Negative, 68.8%

Table 4. Estimated Changes in Net National Benefits (Producer Surplus) Under Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **18.0%** offshore surimi recovery rate (determined value).
(2) Ancillary roe recovery: **1.732%** offshore; **1.73%** inshore.
(3) **Allocations in effect full year.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF %	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 7.1	$ 9.3	$ 9.3	$ 23.2	
Crew	3.3	4.3	4.3	10.8	
Plant	32.2	42.4	42.4	105.8	
TOTAL	**$ 42.6**	**$ 56.0**	**$ 56.0**	**$139.8**	**$ 61.3**
OFFSHORE:					
Vessel	($ 41.9)	($ 55.3)	($ 55.3)	($137.8)	
Crew	(7.5)	(9.8)	(9.8)	(24.5)	
TOTAL	**($ 49.4)**	**($ 65.1)**	**($ 65.1)**	**($162.3)**	**($103.4)**
NET:					
Vsl/plant	($ 2.6)	($ 3.6)	($ 3.6)	($ 8.8)	
Crew	(4.2)	(5.5)	(5.5)	(13.7)	
TOTAL[2]	**($ 6.8)**	**($ 9.1)**	**($ 9.1)**	**($ 22.5)**	**($ 42.1)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 23.3%; Negative, 76.7%

Table 5. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **14.0%** offshore surimi recovery rate (determined value).
(2) No roe production.
(3) **Allocations in effect during "B" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % B season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 5.6	$ 6.9	$ 6.9	$ 17.6	
Crew	2.6	3.2	3.2	8.2	
Plant	15.1	18.7	18.7	47.5	
TOTAL	**$ 23.3**	**$ 28.9**	**$ 28.9**	**$ 73.3**	**$ 30.9**
OFFSHORE:					
Vessel	($ 22.4)	($ 27.9)	($ 27.9)	($ 70.7)	
Crew	(3.8)	(4.7)	(4.7)	(11.9)	
TOTAL	**($ 26.2)**	**($ 32.6)**	**($ 32.6)**	**($ 82.6)**	**($ 53.0)**
NET:					
Vsl/plant	($ 1.8)	($ 2.2)	($ 2.2)	($ 5.6)	
Crew	(1.2)	(1.5)	(1.5)	(3.7)	
TOTAL[2]	**($ 3.0)**	**($ 3.7)**	**($ 3.7)**	**($ 9.3)**	**($ 22.1)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 32.1%; Negative, 67.9%

Table 5a. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **14.0%** offshore surimi recovery rate (determined value).
(2) Offshore/inshore roe recovery equalized.
(3) **Allocations in effect during "A" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % A season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.[1]**
INSHORE:					
Vessel	$ 3.7	$ 4.6	$ 4.6	$ 11.7	
Crew	1.7	2.2	2.2	5.5	
Plant	25.2	31.3	31.3	79.5	
TOTAL	**$ 30.7**	**$ 38.1**	**$ 38.1**	**$ 96.7**	**$ 43.3**
OFFSHORE:					
Vessel	($ 26.1)	($ 32.4)	($ 32.4)	($ 82.2)	
Crew	(4.8)	(6.0)	(6.0)	(15.2)	
TOTAL	**($ 30.9)**	**($ 38.4)**	**($ 38.4)**	**($ 97.4)**	**($ 61.6)**
NET:					
Vsl/plant	$ 2.9	$ 3.6	$ 3.6	$ 9.0	
Crew	(3.1)	(3.8)	(3.8)	(9.7)	
TOTAL[2]	**($ 0.2)**	**($ 0.3)**	**($ 0.3)**	**($ 0.7)**	**($ 18.3)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 49.9%; Negative, 50.1

Table 6. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **16.0%** offshore surimi recovery rate (determined value).
(2) No roe production.
(3) **Allocations in effect during "B" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % B season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 4.9	$ 6.2	$ 6.2	$ 15.6	
Crew	2.3	2.9	2.9	7.3	
Plant	13.1	16.7	16.7	42.1	
TOTAL	**$ 20.2**	**$ 25.9**	**$ 25.9**	**$ 65.1**	**$ 27.4**
OFFSHORE:					
Vessel	($ 21.0)	($ 26.8)	($ 26.8)	($ 67.4)	
Crew	(3.5)	(4.5)	(4.5)	(11.4)	
TOTAL	**($ 24.5)**	**($ 31.3)**	**($ 31.3)**	**($ 78.8)**	**($ 50.5)**
NET:					
Vsl/plant	($ 3.0)	($ 3.8)	($ 3.8)	($ 9.6)	
Crew	(1.3)	(1.6)	(1.6)	(4.1)	
TOTAL[2]	**($ 4.3)**	**($ 5.5)**	**($ 5.5)**	**($ 13.7)**	**($ 23.1)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 23.3%; Negative, 76.7%

Table 6a. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **16.0%** offshore surimi recovery rate (determined value).
(2) Offshore/inshore roe recovery equalized.
(3) **Allocations in effect during "A" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % A season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 3.2	$ 4.1	$ 4.1	$ 10.4	
Crew	1.5	1.9	1.9	4.9	
Plant	22.9	29.3	29.3	73.7	
TOTAL	**$ 27.7**	**$ 35.4**	**$ 35.4**	**$ 89.0**	**$ 39.9**
OFFSHORE:					
Vessel	($ 24.4)	($ 31.1)	($ 31.1)	($ 78.3)	
Crew	(4.5)	(5.8)	(5.8)	(14.5)	
TOTAL	**($ 28.9)**	**($ 36.9)**	**($ 36.9)**	**($ 92.8)**	**($ 58.7)**
NET:					
Vsl/plant	$ 1.8	$ 2.3	$ 2.3	$ 5.8	
Crew	(3.0)	(3.8)	(3.8)	(9.6)	
TOTAL[2]	**($ 1.2)**	**($ 1.5)**	**($ 1.5)**	**($ 3.9)**	**($ 18.8)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 42.3%; Negative, 57.7%

Table 7. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **18.0%** offshore surimi recovery rate (determined value).
(2) No roe production.
(3) **Allocations in effect during "B" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % B season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.**[1]
INSHORE:					
Vessel	$ 4.2	$ 5.6	$ 5.6	$ 13.9	
Crew	2.0	2.6	2.6	6.5	
Plant	11.4	15.1	15.1	37.6	
TOTAL	**$ 17.6**	**$ 23.3**	**$ 23.3**	**$ 58.0**	**$ 24.5**
OFFSHORE:					
Vessel	($ 19.4)	($ 25.6)	($ 25.6)	($ 63.8)	
Crew	(3.3)	(4.3)	(4.3)	(10.8)	
TOTAL	**($ 22.7)**	**($ 29.9)**	**($ 29.9)**	**($ 74.5)**	**($ 47.8)**
NET:					
Vsl/plant	($ 3.7)	($ 4.9)	($ 4.9)	($ 12.2)	
Crew	(1.3)	(1.7)	(1.7)	(4.3)	
TOTAL[2]	**($ 5.0)**	**($ 6.6)**	**($ 6.6)**	**($ 16.5)**	**($ 23.3)**

[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 16.1%; Negative, 83.9%

Table 7a. Estimated Changes in Net National Benefits (Producer Surplus) Under Modified Preferred Alternative Allocation, by year, and Net Present Value of Changes over Life of Program.

Assumptions: (1) **18.0%** offshore surimi recovery rate (determined value).
(2) Offshore/inshore recovery equalized.
(3) **Allocations in effect during "A" season only.**

ESTIMATED CHANGES IN PRODUCER SURPLUS - $ MILLIONS					
Year	**1993**	**1994**	**1995**	**N P V**	
IN/OFF % A season	**35/65**	**37.5/ 62.5**	**37.5/ 62.5**	**Total**	**U.S.[1]**
INSHORE:					
Vessel	$ 2.8	$ 3.7	$ 3.7	$ 9.3	
Crew	1.3	1.7	1.7	4.3	
Plant	20.7	27.3	27.3	68.2	
TOTAL	**$ 24.9**	**$ 32.8**	**$ 32.8**	**$ 81.8**	**$ 36.8**
OFFSHORE:					
Vessel	($ 22.5)	($ 29.7)	($ 29.7)	($ 74.1)	
Crew	(4.2)	(5.5)	(5.5)	(13.7)	
TOTAL	**($ 26.7)**	**($ 35.2)**	**($ 35.2)**	**($ 87.8)**	**($ 55.6)**
NET:					
Vsl/plant	$ 1.0	$ 1.4)	$ 1.4	$ 3.4	
Crew	(2.9)	(3.8)	(3.8)	(9.4)	
TOTAL[2]	**($ 1.8)**	**($ 2.4)**	**($ 2.4)**	**($ 6.0)**	**($ 18.8)**

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[1]Does not include taxes paid to U.S. by foreign entities.

[2]Probability: Positive, 38.4%; Negative, 61.6%

Table 8. Sensitivity of The Net Producer Surplus Calculation to Changes in Product Recovery Rates and Product Prices

Product	% Change in Net Producer Surplus Given a 10% Increasse in:			
	Offhore PRR	Inshore PRR	Offshore Price	Inshore Price
Fillets	-3.41%	1.55%	-9.44%	6.51%
Surimi	-4.99%	9.35%	-18.10%	26.33%
Roe	-8.00%	3.60%	-10.74%	3.91%
Minced	-0.26%	0.02%	-0.53%	0.72%
Meal	-1.07%	0.97%	-0.48%	2.25%

NOTES ON THE COST-BENEFIT RESULT TABLES

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The statistical tables that follow display a range of estimates of changes in net national economic benefits that would result from proposed Amendment 18 to the Bering Sea/Aleutian Islands Groundfish Management Plan. The amendment proposes to allocate the allowable catch (TAC) of pollock in the Bering Sea between the inshore and offshore sectors of the industry during each of the years 1993 through 1995. In the initial year (1993) 35% of the allowable catch would be allocated to the inshore sector and 65% offshore.

The estimates presented in the tables represent the output of a cost-benefit model that was developed in early 1992 by NMFS for a cost-benefit analysis of proposed Amendments 18 and 23, and was later refined. The variation in estimates reflect a range of assumptions with respect to certain key variables in the analysis, principally the offshore surimi product recovery rate and the ancillary product recovery rate for roe. Product prices also represent an important determinant of model results, but these were held constant in all model runs, although a sensitivity analysis is presented (Table 8) which shows how results react to changes in prices of the products yielded from the pollock catches.

Three categories of estimates are shown: one assumes that the proposed allocations would be in effect throughout the year, that is during the "A" and "B" seasons. Another set analyzes the outcome if the allocations were in place during the "B" season only, and the third group estimates the changes in benefits that would occur (compared with no allocation) if the proposal held for the "A" season alone.

Benefits for the purpose of this analysis are identified as producer surplus which is the residual after variable costs are deducted from gross revenues. Changes are measured from a base year case, which is the latest year for which data are available prior to implementation of the allocation program.

The range of results from multiple runs of the cost-benefit model is summarized in the "Summary Table". "Most likely" cases are identified and are based on assumptions that agree with the latest possible verified information with respect to industry performance during the "A" season in 1992, blended with earlier year results where necessary. This table shows that the most defensible results indicate a net loss in surplus in the amount of $20 million over the life of the program and a net loss to U.S. interests that total $45 million. The figures assume that allocations will be effective throughout the year. The higher figure takes into account the amounts of surplus estimated to accrue to foreign as opposed to U.S. interests. There is a high percentage of foreign ownership identified in the inshore sector, and a somewhat smaller percentage of foreign ownership associated

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with the inshore sector. The projected results in this case represent a gain in surplus for the inshore sector in the amount of $115.7 million which is more than offset by a loss of $163.8 million that accrues to the offshore sector.

Comment and testimony throughout the process of the amendment proposal indicates that representatives of the offshore sector generally agreed with the output of various runs of the NMFS cost benefit mode. The inshore sector disagreed with results, although in the latest testimony appear to agree that the modeling approach was correct but the data used as inputs was incorrect. The latest runs of the model as represented in the attached table represent output that takes into account verified suggested changes in the data inputs. Assumptions and data that were not verifiable or readily refuted were not incorporated in the runs.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Alaska Fisheries Science Center
Resource Ecology and Fisheries
Management Division
7600 Sand Point Way NE.
BIN C15700, Building 4
Seattle, WA 98115

November 16, 1992

MEMORANDUM FOR: F/AKO1 - Ron Berg

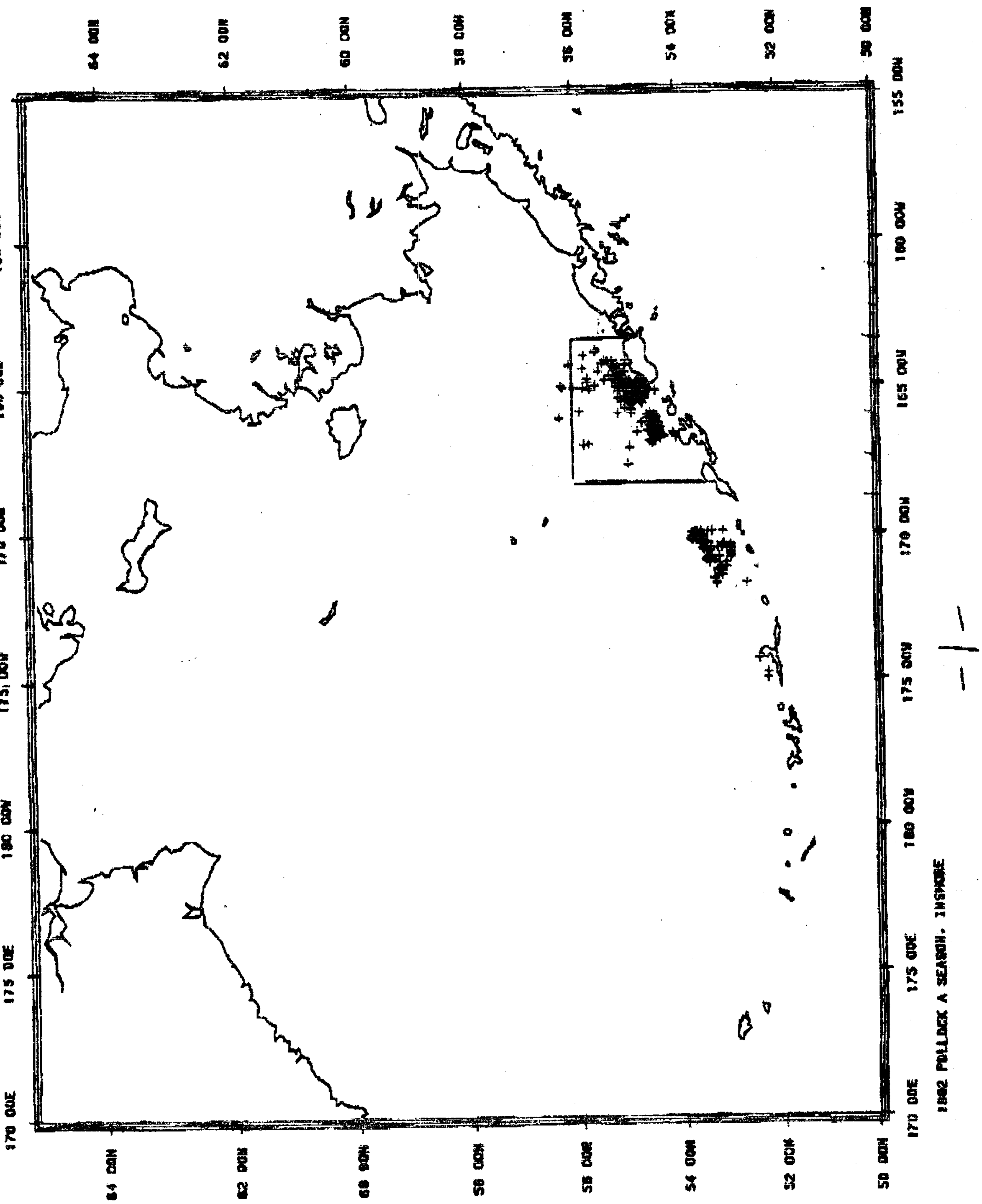
FROM: F/AKC2 - Russ Nelson Russ

SUBJECT: Plots of 1992 Inshore/Offshore Fishing Areas

Attached are the four plots of the 1992 inshore and offshore fishing areas in the pollock "A" and "B" seasons. The data are the trawl locations for individual hauls sampled by observers and are part of the in-season data we now receive from each observer (we made this change in 1992 to handle hot-spot authority). Observers sample between 50% to 60% of the hauls on catcher/processors and motherships and almost all of these vessels have 100% observer coverage. On the shoreside fleet there is a greater mix of 100% and 30% coverage vessels so a smaller portion of the total fleet effort is sampled but observers generally sample a higher percentage of hauls made by a vessel (about 75%) than in the offshore fleet. The few hauls shown in the inshore operational area on the plot of offshore trawl positions for the pollock "B" season are from a catcher/processor less than 125 ft. LOA which I believe would be classified as an inshore fishery. There are also a number of hauls in the inshore operational area taken by catcher boats and delivered to motherships outside in inshore operational area.

Also attached are copies of plots previously run on the 1991 data for the catcher/processor, mothership/floater, and shoreside delivery fisheries. We included these plots for comparison purposes. Let me know if you have any questions on the plots or information contained in them.

Attachments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54 00N
52 00N
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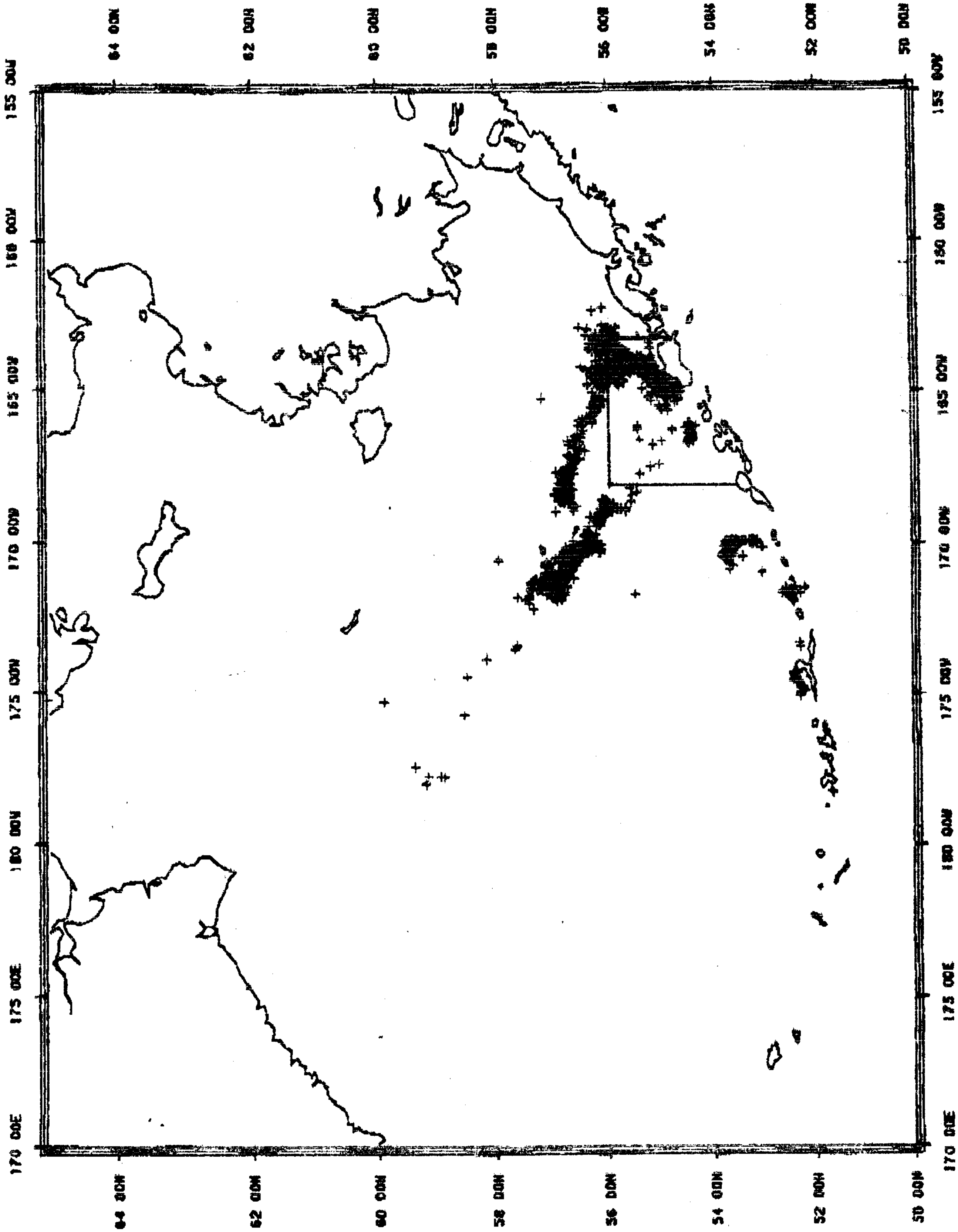
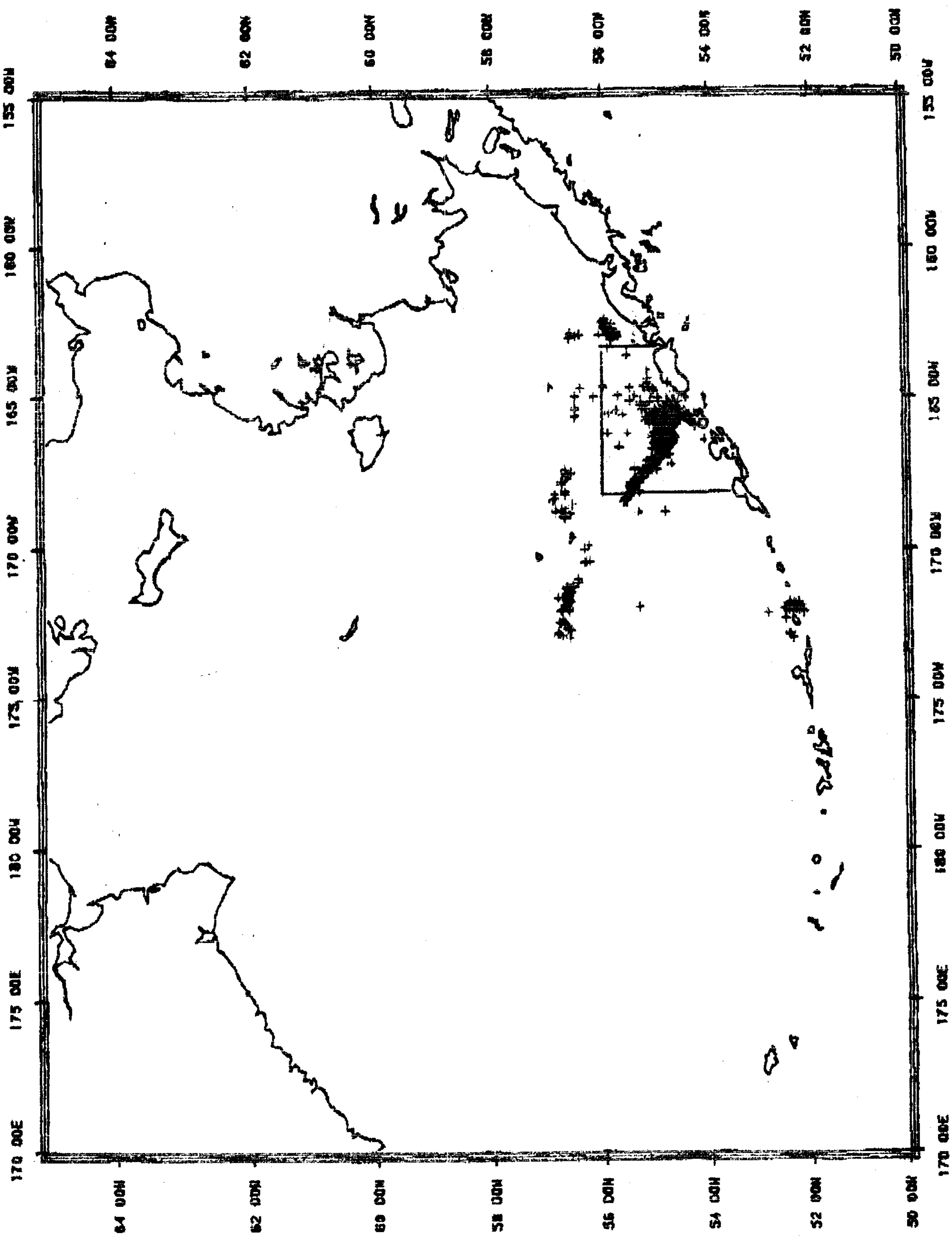
1992 POLLOCK A SEASON, INSHORE



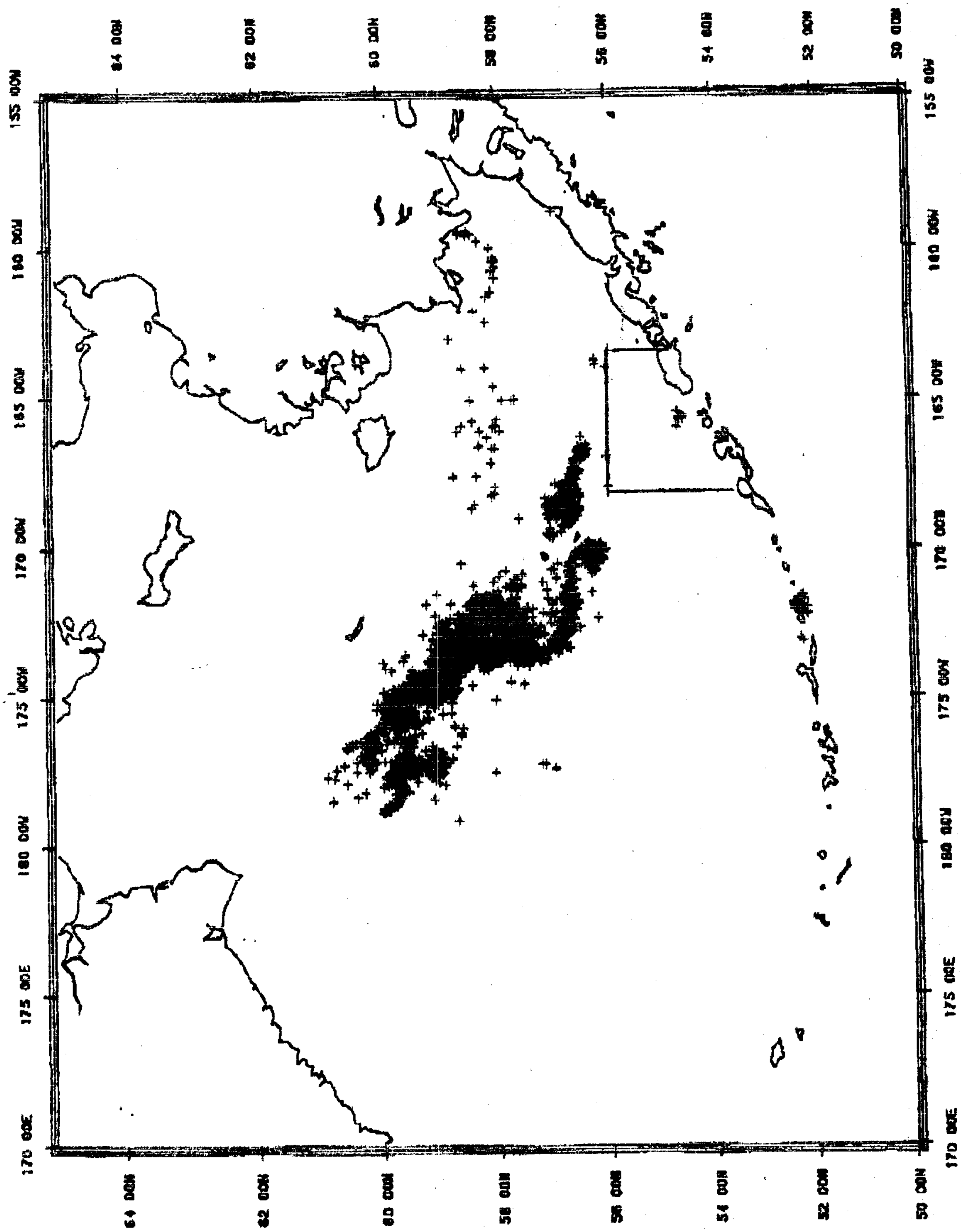
1992 POLLOCK A SEASON, OFFSHORE

-2-



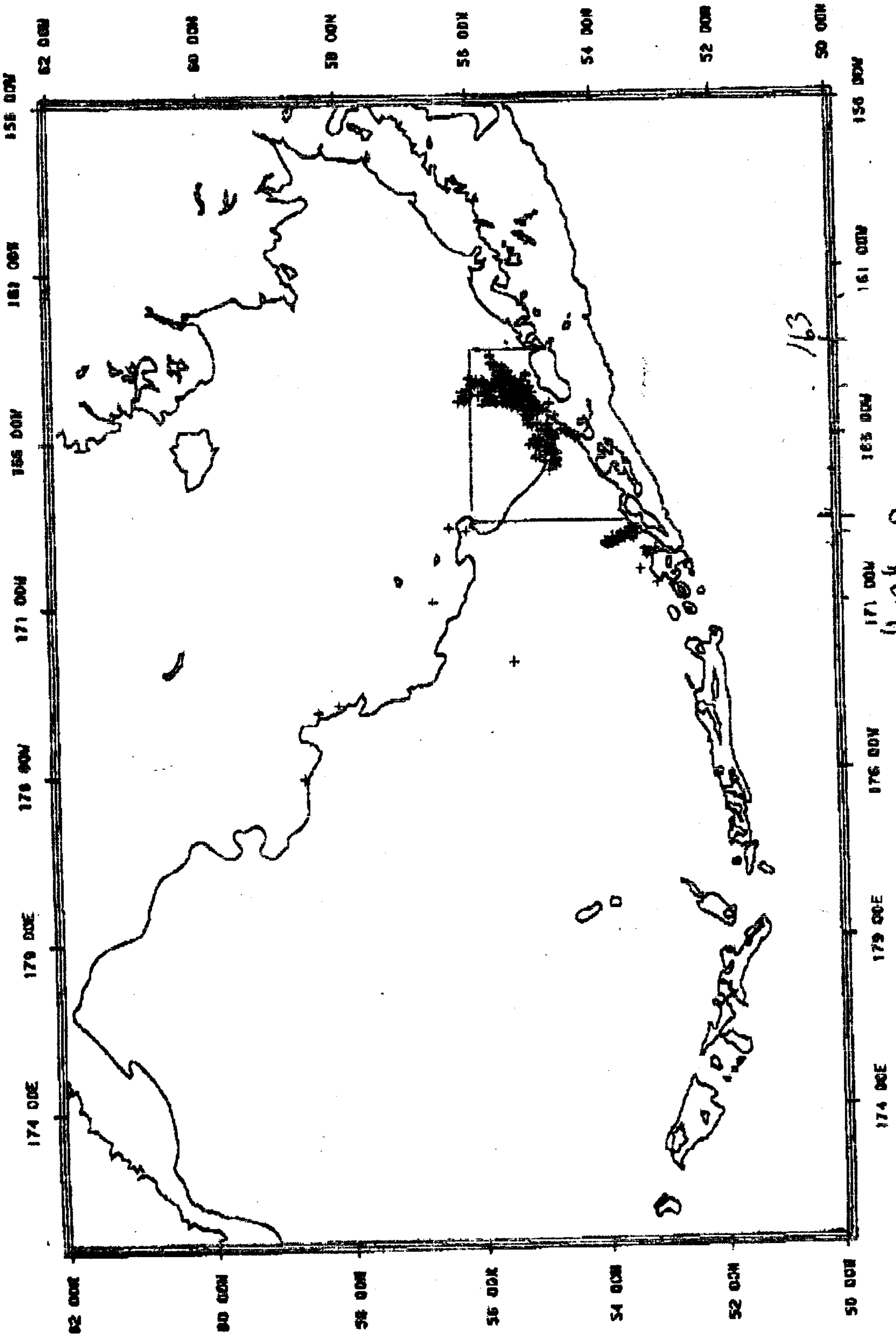
1992 POLLOCK B SEASON, INSHORE

- 3 -

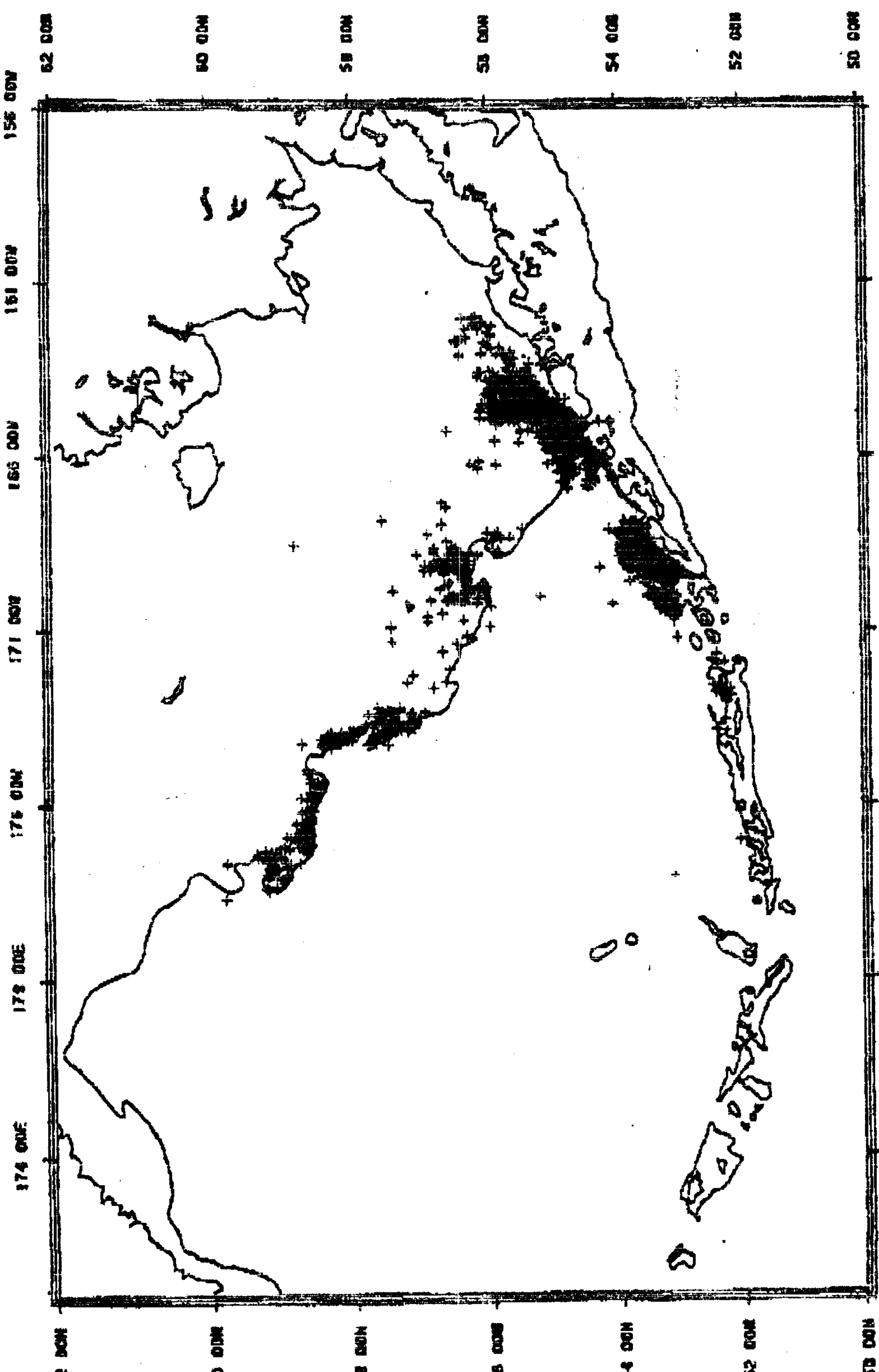


1992 POLLOCK B SEASON, OFFSHORE

-4-



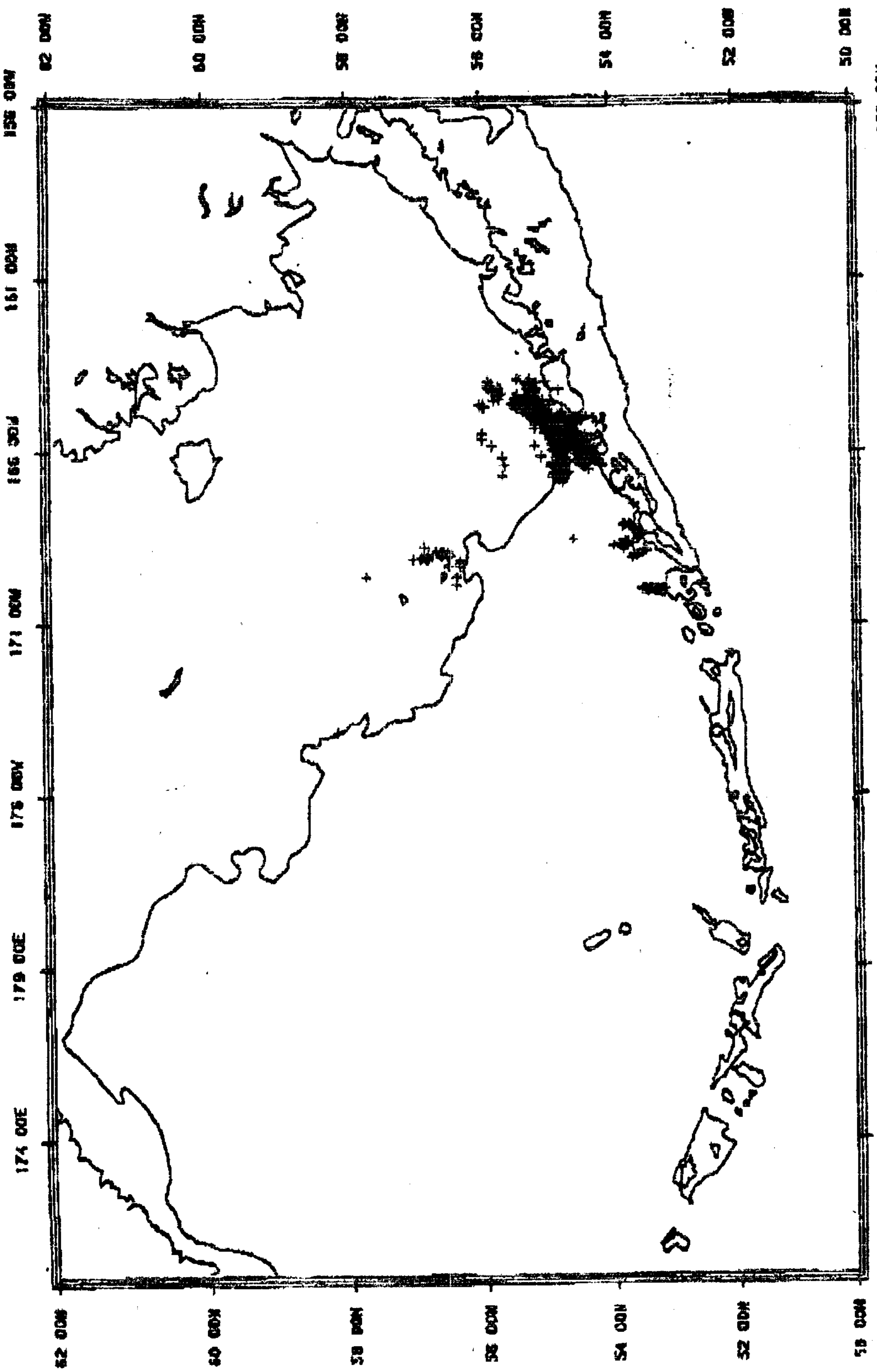
JAN-APR 1981, FL PROCESS/MOTHERSHIP POLLOCK TRAWL LOCATIONS



JAN-APR 1992. CATCHER/PROCESSOR POLLOCK TRAWL LOCATIONS

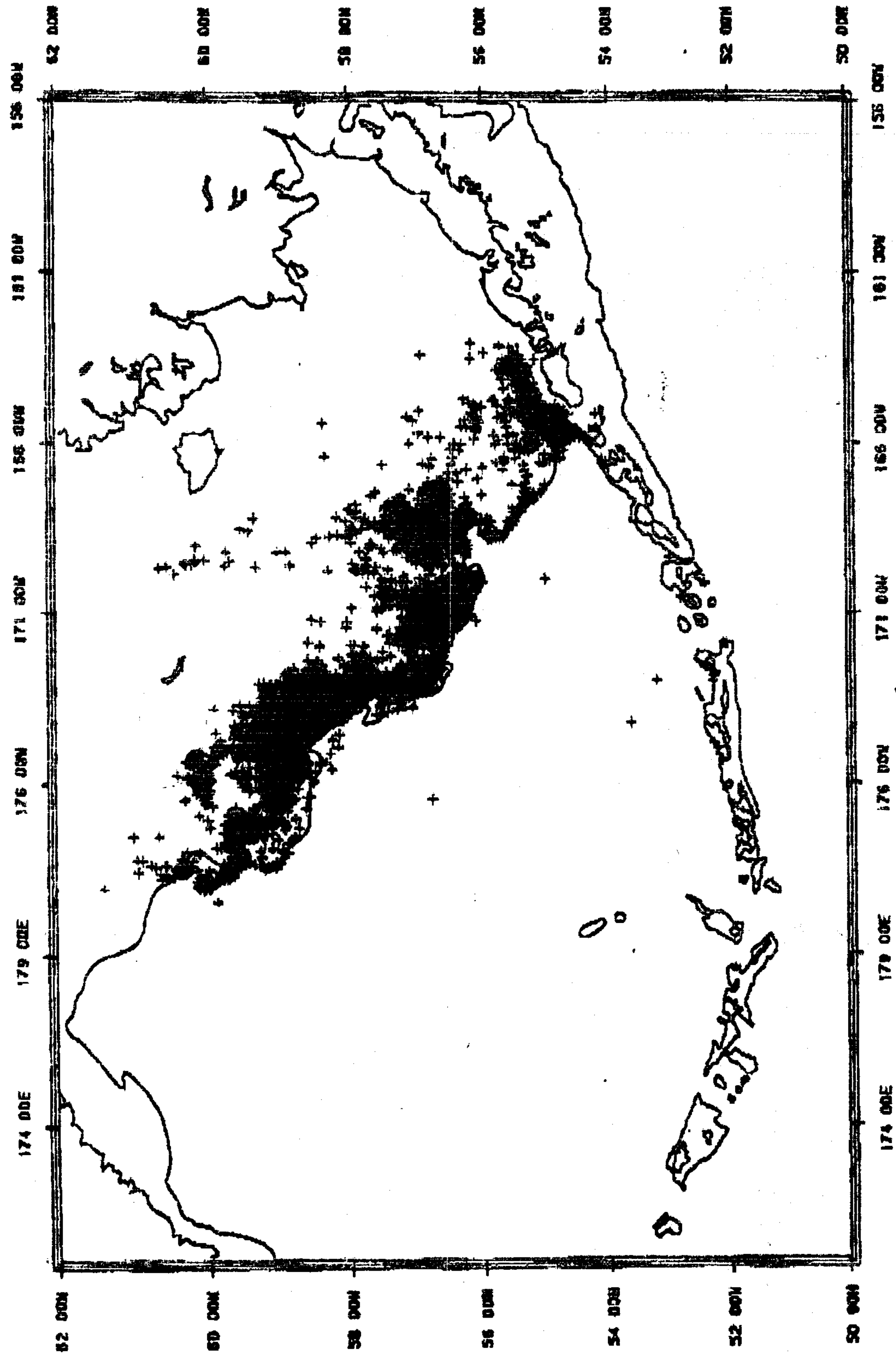
"A" Season

-6-



JAN-APR 1991. SMALL TRAWLERS POLLOCK TRAWL LOCATIONS

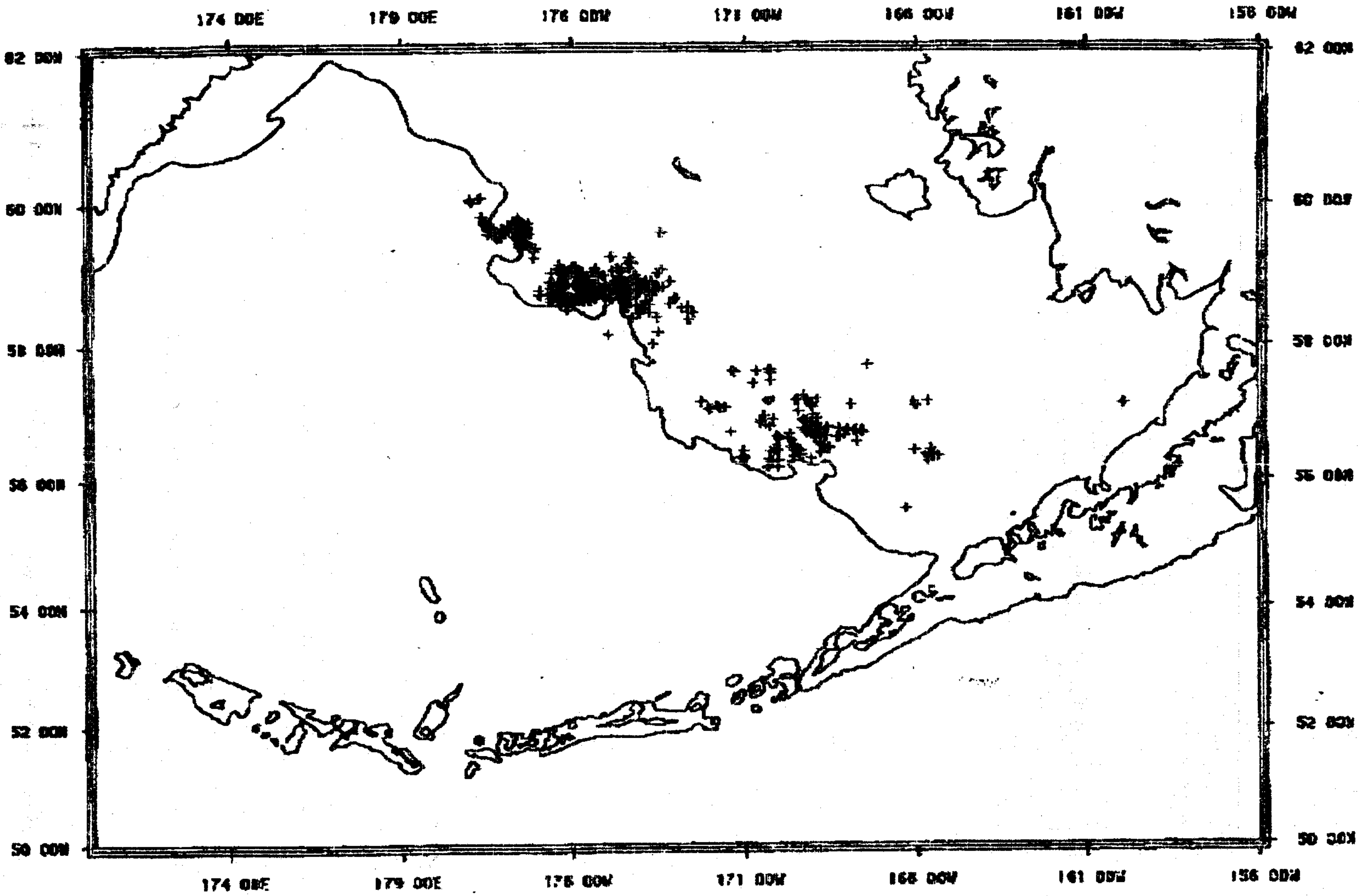
A season



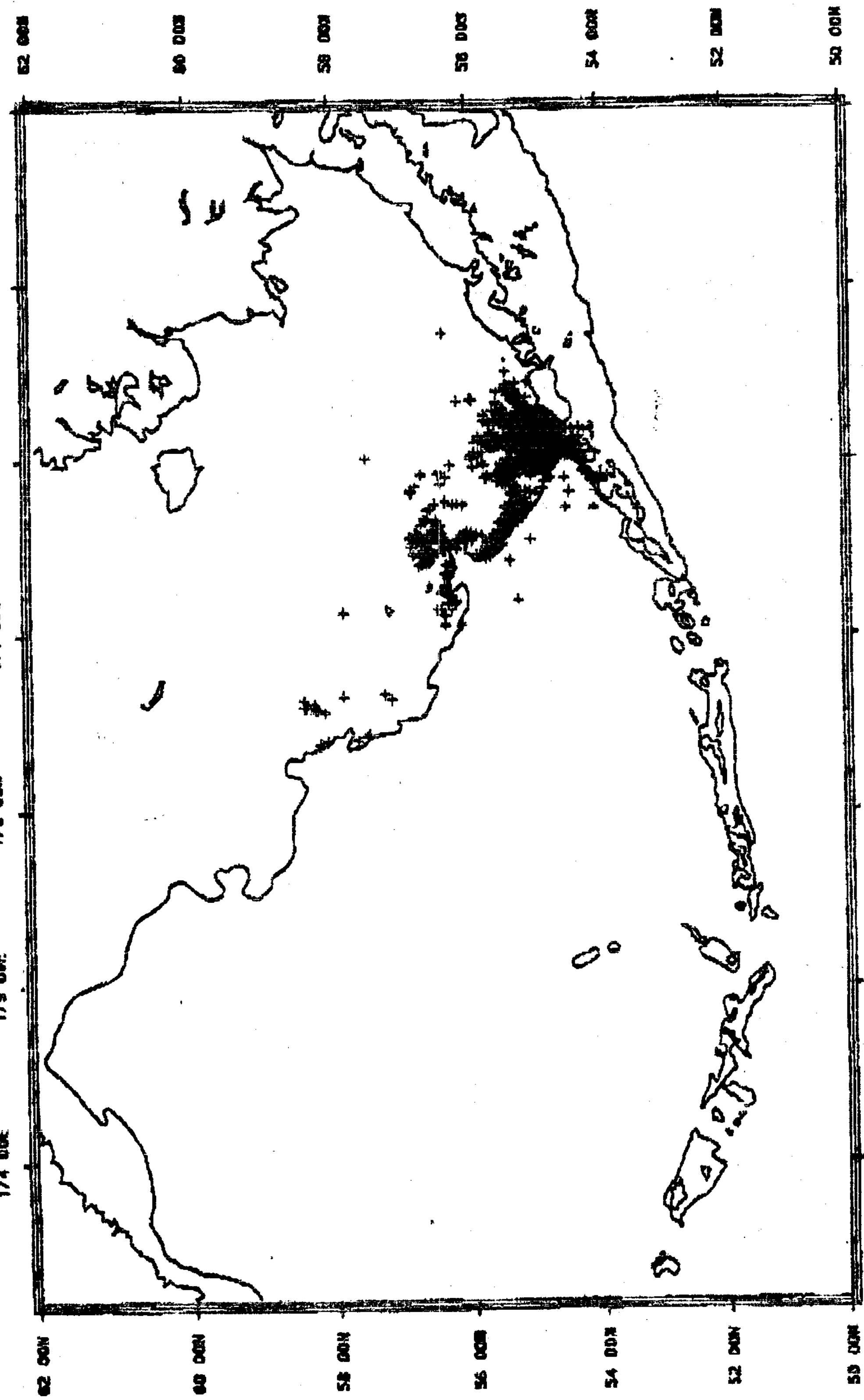
MAY-AUG 1991. CATCHER/PROCESSOR POLLOCK TRAWL LOCATIONS

"B" Season

-8-



MAY-AUG 1991. FL PROCESS/MOTHERSHIP POLLOCK TRAWL LOCATIONS "B" Season



MAY-AUG 1991. SMALL TRAWLERS POLLOCK TRAWL LOCATIONS

"B" Season

-10-

Amendment 18 to the Bering Sea and Aleutian Islands Groundfish FMP

Changes to FMP:

1. In Section 14.4.1, the second sentence is changed to read as follows:

"Information required when applying for a federal fishing permit and restrictions on the use of such permits are contained in 50 CFR 675.4 of domestic regulations implementing the FMP."

2. Add new Section 14.4.11 as follows:

14.4.11 Inshore/offshore allocations of pollock

In addition to the provisions of Section 14.4.10, the Bering Sea and Aleutians pollock TAC will be allocated between the inshore and offshore components of industry in specific shares in order to lessen or resolve resource use conflicts and preemption of one segment of the groundfish industry by another, and to promote conservation and management of groundfish and other fish resources.

14.4.11.1 Definitions

Offshore means that component of industry that includes all catcher/processors not included in the inshore processing category and all motherships and floating processing vessels which process pollock in the BSAI at any time during the calendar year in the Exclusive Economic Zone.

Inshore means that component of industry that includes all shorebased processing plants, all catcher/processors which meet certain production and length requirements defined in federal regulations, and all motherships and floating processing vessels, which process pollock in the BSAI at any time during the calendar year, exclusively in the Territorial Sea of Alaska.

The Secretary is authorized to suspend the definitions of catcher/processor and shoreside as prescribed by federal regulations implementing this FMP to allow for full implementation of section 14.4.11.6

14.4.11.2 Declarations and operating restrictions

Annually before operations commence, each mothership, floating processing vessel and catcher/processor vessel must declare whether it will operate in the inshore or offshore component of industry. Once declared, a vessel cannot switch to the other component and will be subject to restrictions on processing locations for pollock for the rest of the fishing year as prescribed in federal regulations implementing this FMP. Harvesting vessels can choose to deliver their catch to either or both components, but once an allocation of TAC has been reached, the applicable processing operations will be closed for the rest of the year unless surplus reapportionment is made.

14.4.11.3 Reapportionment of unused allocations

If during the course of the fishing year it becomes apparent that a component will not process the entire amount, the amount which will not be processed shall be released to the other components for that year. This shall have no impact upon the allocation formula.

14.4.11.4 Allocations

The BSAI pollock TAC shall be allocated according to a phase-in schedule as follows:

	Inshore	Offshore
Year 1	35.0%	65.0%
Year 2	37.5%	62.5%
Year 3	37.5%	62.5%

The percentage allocations are made by subarea and period as provided in federal regulations implementing this FMP. Trawl catcher/processors will be able to take pollock incidentally as bycatch.

14.4.11.5 Bering Sea Catcher Vessel Operational Area

In the "B" season for pollock, a catcher vessel operational area shall be defined as inside 168 degrees through 163 degrees West longitude, and 56 degrees North latitude south to the Aleutian Islands. Any pollock taken in this area in the directed pollock fishery must be harvested by vessels which do not process pollock.

14.4.11.7 Duration

Inshore-offshore allocations of pollock and the Western Alaska Community Quota program shall cease to be a part of this FMP either (1) at midnight on December 31, 1995; or (2) earlier if replaced with another management regime approved by the Secretary.

Responses to Comments - Amend 18 as of 11/10/92

The allocations of pollock in the BSAI area that are implemented by Secretarial approval of revised Amendment 18 continue to be as controversial as the original Amendments 18 and 23. Twenty letters of comment were received from 16 different entities during the comment period. Of the 16 entities submitting comments, nine opposed and seven expressed support for the action. Most of these comments are lengthy and raise many points of concern. Key issues and concerns raised by these comments are summarized and responded to as follows:

Comment 1: Revised Amendment 18 violates national standard 1 of providing for the greatest overall benefit to the nation because (1) the supplemental analysis projects a cumulative loss of $85.8 million and (2) the alternative benefits only Alaskan onshore processors and reduces competition by restricting the choices of to whom a fisherman can deliver.

Response: National standard 1 requires fishery conservation and management measures to prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery. Executive order 12291 requires that the economic benefits be in favor of society as a whole. The allocations as proposed in revised Amendment 18 do not reduce the likelihood of pollock TAC being reached. Weekly production report data indicates that the inshore and offshore components have sufficient capacity as well

as sufficient opportunity to harvest and process the available OY.

Concerning the overall national benefit, the Secretary has determined that national benefits would result by maintaining a balance in the social and economic opportunities inherent in the fisheries. One of the nine Council Comprehensive Fishery Management Goals for the development of fishery management plans is to ensure that the people of the United States benefit from optimum utilization of the Nation's publicly owned fishery resources. The benefits to the Nation will be demonstrated by the social gains of Alaskan communities, including the promotion of economic stability, growth, and self-sufficiency in these maritime communities. The allocations of revised Amendment 18 that benefit the coastal communities of Alaska and aid them in achieving a stable, self-sufficient, and growing economy balance any potential losses to the Nation.

For a discussion of the issue on competition, see response to comment 34.

Comment 2: Revised Amendment 18 violates national standard 2, which states that conservation and management measures shall be based upon the best scientific information available.

Response: As was explained in the final rule published June 3, 1992 (57 FR 23321) for Amendments 18/23, the administrative record does not close until the Secretary makes a decision. During the public comment period, NOAA uses the Council's data to review the Council's findings. The decision of the Secretary is

based on the supplemental analysis as well as public comment received. The availability of new information must always be considered and incorporated into a final FMP where practicable. Based on the record developed by the Council and NMFS, the Secretary has determined that the record contained sufficient information and that the information available was the best and most current possible for approval of revised Amendment 18.

Comment 3: National standard 4 is violated in that revised Amendment 18 discriminates against fishermen who deliver to shoreside processors in other states. In addition, the regulations would not allow freezer vessels to package frozen headed and gutted or round fish for later shoreside processing, which discriminates among processors of different states. Further, the CDQ discriminates among residents from different states.

Response: Several concerns similar to comment 3 had been addressed in the final rule published for Amendments 18/23 on June 3, 1992 (57 FR 23321). The percentage change of the allocation does not conflict with the reasons given in the final rule for Amendments 18/23.

Regulations implementing revised Amendment 18 do not restrict owners or operators of catcher vessels from delivering to either inshore or offshore processing sectors; however, once a component reaches its TAC, catcher vessels can only deliver to the other component. NOAA contends that the revised allocations will not discriminate among residents of different states.

As stated in the final rule for Amendment 18/23, the CDQ program does not discriminate between Alaskans and non-Alaskans on the basis of State of residence. The adverse effect of the CDQ program in setting aside pollock reserve for use by western Alaskan communities for CDPs falls equally upon similarly situated Alaskans and non-Alaskans. Regulations that are determined to discriminate against residents from different States would not be approved.

See also response to comment 34.

<u>Comment 4</u>: The allocations do not violate national standard 4 as they represent a fair compromise balancing needs and interest of industry, state, and coastal communities.

<u>Response</u>: Comment noted. The Secretary has determined that the revised allocations in the BSAI are consistent with the fair and equitable criterion of national standard 4. Fleet management is not expected to change with the amendments as approved by the Secretary. Traditional measures of inseason actions and observer coverage will continue to be utilized by NMFS. See response to comment 3.

<u>Comment 5</u>: The proposed regulations violate national standard 5 in that the efficient utilization of the resource would be adversely impacted and because the only justification for the proposed action is economic gain by one sector. In addition, to ignore modern technology for fear of preempting an older technology violates the efficiency requirements. The amendment merely acts like a subsidy to less efficient producers.

Response: A similar comment was raised during the review of Amendments 18/23. National standard 5 requires fishery conservation and management measures to promote efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose. In theory, an efficient fishery would harvest all the allowable catch with a minimum use of economic inputs (e.g., labor, capital, fuel, etc.). As was the case with Amendments 18/23, revised Amendment 18 is not substantially less efficient than the current open access fishery. Modern technology is not necessarily preferred if the result is to reach the TAC far before the end of the fishing year. The factory trawler fleet is capable of harvesting a large amount of fish in a short period of time, which can quickly lead to an overharvest. In addition, one of the purposes of the inshore/offshore allocations is to protect the smaller, more localized fleets and allow continued development of coastal communities in the BSAI.

NOAA has determined that revised Amendment 18 does not have economic allocation as its sole purpose. The allocations as revised could reduce the bycatch of prohibited species and improve the overall recovery of fish products from the round weight harvested. In addition, the marginal economic loss to the Nation of the allocations is offset by social benefits in the coastal communities. The fact that a non-resident or foreign work force is hired to work in local processing plants during peak fishing seasons when local labor supply is insufficient does

not detract from the stabilizing effects of long-term fishing and processing on the local economy. Transient labor contributes to local community economies through its demands for goods and services. Finally, any allocation of fishing privileges will cause some industry participants to be better off and others to be worse off than they would have been without the allocation. This is acceptable under the guidelines of the national standards of 50 CFR 602, providing that such allocations are justified by the achievement of overall biological, economic, and social benefits. The Secretary determined that the revised allocations of Amendment 18 are justified on these criteria.

Comment 6: There is no evidence that revised Amendment 18 violates national standard 5.

Response: Comment noted. See response to comment 5. The benefits of economic stability and social gains to the Alaskan coastal communities balance potential economic losses to the Nation.

Comment 7: Revised Amendment 18 violates national standard 6, which states conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Response: A similar comment was raised during the review of Amendments 18/23. As was explained in the final rule published June 3, 1992 (57 FR 23321), the promotion of conservation must be considered when establishing an allocation. The Secretary had determined that limiting the ability of the offshore fleet to

receive more than the percentages of fish harvest allocated would promote conservation in terms of social and economic development to the inshore sector.

In addition, the final rule published for Amendments 18/23 discussed the possibility of increased fishing effort in the CVOA and its impact on the availability of food resources to Steller sea lions. As was stated in the final rule, and as applies to revised Amendment 18, the overall amount of TAC available for harvest in the BSAI will not be affected by the amendment.

NMFS completed formal section 7 consultations on the 1992 BSAI TACs on January 21, 1992, to evaluate their effects on Steller sea lions as well as on other listed species. And, the March 4, 1992, biological opinion for Amendment 18 concluded that the implementing regulations for the Amendment as approved for the "B" season would actually limit to a greater extent the amount of fishing effort that could be conducted in this area. Revised Amendment 18 would proportionately allocate the yearly available harvest of pollock to inshore, offshore, and western Alaska community sectors within the BSAI fishing industry. Therefore, implementation of revised Amendment 18 is not likely to jeopardize the continued existence of endangered or threatened species.

Environmental impacts were analyzed in the draft supplemental analysis prepared by NMFS and the Council on September 3, 1992, for revised Amendment 18, and during the review process for Amendments 18/23.

Comment 8: Revised Amendment 18 does not meet national standard 7, because it actually increases costs and promotes duplication of capital.

Response: National standard 7 requires fishery conservation and management measures to minimize costs and avoid unnecessary duplication, where practicable. The supplemental cost-benefit analysis performed concluded that the revised allocations would result in net negative benefits, which are actually less than those presented in the analysis for Amendments 18/23. In any event, the developmental benefits to be experienced by the Alaska coastal communities outweigh the net negative loss to the Nation. The Magnuson Act allows for an allocation of fishing privileges that may impose a hardship on one group if it is outweighed by the total benefits received by another group or groups, whether or not the net benefit is positive. Other alternatives considered were rejected, because they were either too restrictive to the offshore component or would not have prevented preemption of the inshore component by the offshore component.

Comment 9: The partial denial of Amendment 18, which referenced national standard 7, was based on a flawed analysis, because it confused net national benefits with corporate profits.

Response: As stated in the March 4, 1992, disapproval letter from Dr. Knauss to the Council, the economic effects in the years following the 1992 allocations in the BSAI may not have been fully understood and a supplemental analysis would be necessary. Since that time, economists with NMFS and the Council

have prepared a supplemental analysis using the proposed allocations. The cost-benefit analysis concludes that the proposed allocations, as revised, will not present an undue economic hardship that is not outweighed by developmental benefits in the Alaska communities.

Comment 10: Amendment 18, as revised, addresses the Department of Commerce's concerns in the previous partial disapproval as it substantially reduced the original proposed allocation, removed the restriction on offshore vessel access in the CVOA during the roe or "A" season (January 1-April 15), and permitted mothership vessels to operate in the CVOA during the non-roe or "B" season (June 1-December 31). Based, in part, on these significant changes, revised Amendment 18 should be approved.

Response: The above issues have been addressed during the review process for revised Amendment 18. However, approval of revised Amendment 18 is based on the social and developmental benefits to be experienced by the Alaska coastal communities. The allocations to be implemented were chosen, because they were the most likely to benefit the inshore component without causing substantial losses to the offshore component or the Nation. The decision to allow offshore vessels to operate in the CVOA during the "A" season was due to the extreme importance this area and time have for the offshore sector. To deprive them use of the CVOA during the "A" season should present too great an economic burden. And, allowing motherships to operate in the CVOA would

prevent undue hardships on the smaller catcher vessels in this area.

Comment 11: A number of opposing comments were submitted in response to the proposed rule announcing Amendments 18/23 (57 FR 66009, December 20, 1991). These comments were submitted by crewmembers on offshore vessels, seafood industry employees and representatives, and other interested parties. The main points stressed in opposition to Amendments 18/23 included: (1) many at-sea workers had found steady, well-paying jobs, not readily available otherwise; (2) many of these workers came from areas of high unemployment; (3) the at-sea fleet offers upward mobility for women and minorities; and (4) the high-pay and other aspects of at-sea employment make it possible to pursue goals in life that would otherwise be unattainable. These same comments apply to revised Amendment 18 and should be addressed. Many of the deficiencies identified with the initial amendment have not been addressed in the supplemental analysis.

Response: The comments that had been submitted during the review period for Amendments 18/23 were addressed at that time. A resubmission of these comments does not provide any new information that was not considered under Amendments 18/23, and the explanations to those comments covered in the final rule published June 3, 1992 (57 FR 23321), apply to revised Amendment 18. However, the same issues presented in those comments have been addressed throughout this final rule. Opportunity costs, advancement opportunities, and differences in labor options;

however, for shoreside versus at-sea are difficult to evaluate.

Comment 12: Revised Amendment 18 still does not address the underlying problem of overcapitalization in an open-access fishery and may even encourage additional capital investment within the inshore sector. Therefore, the Nation is no closer to solving problems in the North Pacific groundfish fishery. The Council and NMFS should direct their attentions to other, more important issues that need to be faced (i.e., stock assessments, bycatch, and management of new technologies) rather than this course of protectionist regulations that threaten to destroy rather than enhance the Magnuson Act system. Conservation and management objectives should, instead, be met by establishing performance requirements.

Response: The issue of overcapitalization in an open-access market was addressed during the review of Amendments 18/23. NOAA agrees that the current olympic system is inefficient and wasteful in the sense that it fosters more investment in fishing enterprises than is necessary to catch the amount of fish available for harvest in any fishing year. As stated, one purpose of the allocations is to serve as a preliminary step toward solving the problem of overcapitalization. The allocations as approved by the Secretary will allow for a temporary solution while more permanent management measures can be evaluated (i.e., limited entry, ITQs). In the meantime, NMFS will continue to provide necessary fishery management actions as done in the past.

Comment 13: The stated purpose of the allocation is to prevent preemption; however, the final allocation will actually lower the share of the TAC currently being utilized by the offshore fleet in the BSAI. The result transfers more resource than has been the historical take from one sector (offshore) to another (inshore). Thus the preferred alternative within revised Amendment 18 does not solve the stated problem of preemption, but rather creates it.

Response: The allocations of revised Amendment 18 intend to maintain the percentage of take between the inshore and offshore components as close to historical catch as is possible while providing protection to the less-advantaged inshore sector. NMFS data indicate that shoreside processing of pollock harvested in the BSAI was 28 percent in 1991. Therefore, the proposed allocation is not significantly different from recent patterns of processing pollock in the BSAI. Preemption of the offshore component would not be possible as it is also guaranteed a percentage of the allocations that cannot be processed by the inshore component. In addition, the percentage allocated to the offshore component provides them with a greater amount than is allocated to the inshore component.

Comment 14: The intent of the Magnuson Act was not to allow one sector (offshore) to smother development of social and economic stability in another (coastal communities). Preemption is a continuing problem. Originally, the foreign distant water fleet preempted U.S. fishermen, and now the U.S. distant water

fleet is preempting coastal communities.

Response: NOAA recognizes that protection of the inshore component from the offshore component is needed, because the mobility of the offshore component gives it a competitive advantage. However, the groundfish resources off Alaska are a national resource. All U.S. fishing vessels, regardless of their home port, currently enjoy the same Alaska groundfish harvesting privileges under the BSAI groundfish FMP. The preemption problem stems from the excess harvesting and processing capacity to prosecute the fishery, and not the geographic origin of that capacity.

Comment 15: The Magnuson Act encouraged American fishermen to invest in harvesting and processing facilities and many factory trawlers have achieved the capacity to harvest 100 percent of the pollock TAC. The allocations would take a large portion of pollock (worth between $34,994,845 and $54,537,433) away from factory trawlers and give it to another sector, thereby, putting many American fishermen out of business.

Response: The Magnuson Act established U.S. authority for the conservation and management of fishery resources within the EEZ and provided for priority access to those resources by U.S. fishing and processing firms. Although the enactment of the Magnuson Act and subsequent amendments was an invitation to the U.S. fishing industry to develop domestically underutilized fishery resources, especially off Alaska, it provided no guarantee that investments in such development would enjoy long-

term profitability. The high risk nature of the fishing industry suggests that investments in it also are at high risk of failure. The Magnuson Act also authorizes the allocation of fishery resources among various sectors of the fishing industry, that is consistent with all applicable laws. The Secretary has determined that the allocation of the BSAI pollock TAC between inshore and offshore components, as proposed by the Council in revised Amendment 18, is consistent with all applicable laws. While this allocation may produce more benefits for the inshore component then the offshore component, both sectors should realize some decrease of investment risk, in the short term, resulting from better knowledge of the amount of BSAI pollock that will be reserved specifically for either component. Intra-component competition for the pollock resource will continue to be a source of uncertainty and risk, but inter-component competition, with its attendant risks, will cease with the implementation of this rule. This should allow improved investment decision making for both components.

Comment 16: Catcher boats played an important role in the Americanization of the Alaska groundfish fisheries and yet, the superior catching capability of the factory trawlers has preempted them. Approval of revised Amendment 18 would provide a sufficient short-term measure. In addition, the smaller catcher boats cannot compete with the factory trawlers, particularly in stormy weather. Approval of the CVOA will enable catcher vessels to fish closer to shelter and still make deliveries to

motherships. Amendment 18 should be approved as it addresses the preemption of catcher vessels by factory trawlers.

Response: The development of a U.S. groundfish fishery in the BSAI area began in 1980 with U.S. catcher vessels delivering pollock and other species to foreign processing vessels in joint venture processing (JVP) agreements. Significant harvests by U.S. catcher/processors began in 1985. The development of shorebased pollock processing also began in the mid-1980s. Under the Magnuson Act, however, the foreign and JVP fisheries were sequentially replaced in favor of the wholly domestic fishery. The last year in which any groundfish were allocated to JVP fisheries in the BSAI area was 1990. Many of the former JVP catcher vessels were converted to deliver fish to the shorebased processors, and some developed a JVP-style market with U.S. motherships. In both cases, the catcher vessels are generally smaller and more limited in their range then catcher/processors in the offshore component. Revised Amendment 18 recognizes this history by providing for catcher vessels that deliver BSAI pollock to the inshore component, which has a specified allocation of the pollock TAC, and by providing those that deliver to U.S. motherships opportunity to fish within the CVOA during the pollock "B" season.

Comment 17: Preemption of the catcher boats by factory trawlers should be addressed from a harvesting perspective rather than one of processing.

Response: The Council considered the alternative of

allocating pollock (and Pacific cod in the GOA) between vessels that catch and process at sea and vessels that catch for delivery to processors regardless of whether they are on shore or at sea. This is alternative 6 in the final supplemental environmental impact statement prepared by the Council for Amendments 18/23. The Council did not recommend this alternative, because it did not adequately address the Council's objective of assuring shorebased processors a specific proportion of the pollock TAC.

<u>Comment 18</u>: The proposed allocation shifts resources away from the offshore fleet which is primarily from the Pacific Northwest (Washington and Oregon) to the shoreside plants in local Alaskan communities. As a result, Alaska will gain a relatively small number of jobs and increased income impacts at the expense of the Pacific Northwest having much greater losses. Such a reallocation of jobs and income from one region to another has not been justified. The bottom line is that the Pacific Northwest will suffer significant economic hardships as well as direct income and job losses at a time when the entire nation is concerned with rising unemployment and economic growth.

<u>Response</u>: The analytical results support this general conclusion that net benefits will be less than zero but economic considerations are only 1 element of the decision-making process.

<u>Comment 19</u>: The inshore sector had no catch history prior to inshore/offshore allocations. The largest shoreside catchers came on line just this year and many have a significant percentage of ownership directly related to Con-agra (Trident),

Unisea (Nippon-Suisan), and Westward (Taiyo). These are not the "family farm" companies the Council claims to be protecting.

Response: During the review of Amendments 18/23, representatives of several inshore plants testified that they had not been operating at full capacity previously, because they did not have enough fish to supply the plants. For pollock in the BSAI, the inshore sector took 20 percent, 17 percent, and 28 percent for 1989, 1990, and 1991, respectively. The 3-year average in the BSAI for the inshore sector was 21.7 percent and for offshore, it was 78.3 percent.

As was detailed in the final rule that published the approval of Amendment 23 and the partial approval of Amendment 18, the Magnuson Act had encouraged the "Americanization" of foreign fisheries off Alaska and between 1977, when the Magnuson Act was first implemented, and 1990, the last year of joint venture fishing off Alaska, U.S. fishing and processing companies developed Alaska groundfish and crab fisheries that now provide billions of dollars worth of seafood for domestic use and export, and provide thousands of jobs. Although the Magnuson Act provided the basic conservation and management framework for this development, the U.S. "fish and chips" policy also played an important role. Under this policy, foreign companies that transferred (pollock) processing technology and invested in U.S. fish processing companies were rewarded preferential allocations of the total allowable level of foreign fishing within the EEZ. Some Japanese companies were especially cooperative under this

policy, the result of which is that some shore-based processing firms in Alaska are owned in whole or in part by Japanese fish processing companies.

NOAA recognizes that some of these firms will benefit from implementing the Council's recommended plan for allocating pollock. This will not result in foreign control of the pollock fishery. In 1991, BS subarea pollock delivered to inshore plants accounted for about 28 percent of the total BS pollock harvested that year. This harvest was a significant increase over the 17 percent processed in 1990. Based on this growth rate, these plants were expected to process in excess of 30 percent of the total BS pollock harvest in 1992 even without the specified inshore-offshore allocation. The principal benefit to operators of these plants from this action is that they are assured of no less than their expected performance. Hence, the offshore fleet will continue to have access to most (65 percent in 1993 and 62.5 percent in 1994 and 1995) of the available pollock quota in the BSAI and most (60 percent) of the available pollock off Alaska. Even if all of the shore-based processing plants were entirely owned by foreign companies, which is not the case, they likely could not collectively control the pollock market with control over, at best, 40 percent of the Alaska pollock harvest. Instead of control, the Secretary anticipates that the cooperative relationship among U.S., Japanese, and other foreign firms that have invested in the Alaska groundfish fisheries (both inshore and offshore) will continue to be beneficial for all parties

involved.

Comment 20: Revised Amendment 18 does not demonstrate any net social benefits. It threatens jobs as well as the economic and social well-being of communities and individuals in Washington, which could lead to revenue losses and economic dislocations in Washington State. In addition, the allocations discriminate against Washington State coastal communities by favoring Alaska shoreside processing plants. It takes from one sector to give to another.

Response: Either with Amendment 18 or not, the overall fishery continues to be an open-access system. Individual fishermen or processor are afforded no guarantee of access to a given amount. The analysis does conclude that losses in jobs and revenues will occur in the Pacific Northwest but will be partially offset by gains to employment and revenue in Alaska.

Comment 21: There is no realistic benefit or justification that outweighs the significant harm to the offshore fleet or those dependence on the health of that fleet. The proposed allocations would result in significant economic losses without any demonstrable countervailing benefits. The Council has failed to provide any new reason why the Secretary's initial rejection of this part of the proposal should not stand.

Response: The revised analysis does provide the same general economic results, but in order to attain other social goals, these considerations could cause the Council to give more or less weight to benefits or costs imposed on different segments

of the industry. Increasing national net benefits is only one of the many policy goals of this agency.

Comment 22: Communities that are located close to the fishing grounds face fewer alternative opportunities for economic advancement and thus have a greater reliance on access to these fisheries than the distant water fleets do. Approval of the allocations of Amendment 18, especially with the CVOA, will be important for the economic health and development in the small coastal communities of Alaska. It would allow for stabilization and growth of locally generated municipal revenues, which are derived mainly from taxes on raw fish landed, collected from shore-based vessels and plants as well as from local property taxes. Pollock is becoming a more significant source of this revenue. Without this guaranteed access, instability will occur.

Response: NOAA agrees that the coastal communities have a smaller job base and could be viewed as having a higher reliance on fisheries, although not necessarily on pollock stocks. These communities have not had a historical dependence on pollock, per se, but on the crab and salmon fisheries. As shoreside plants process more raw fish in general, total government revenues should increase but those additional revenues might be offset by added expenditure requirements as additional demand for governmental services is created by any growth. An increase in the pollock allocation could lead to less, not more, stabilization of the community if, for example, a "boom" economy is the result. The best base on which a community could build

its stability is not necessarily fishery-dependant as it tends to consist of inherent cyclical variations.

Comment 23: Amendment 18 will provide increased employment and long-term stability for Alaskan coastal communities.

Response: The amendment is expected to increase the number of harvesting and processing jobs available in the inshore sector but this action is only intended to be a short-term solution and the long-term stability of the Alaskan coastal communities that are dependent on the fishery resource will be determined by the rationalization of the fisheries. To the extent, that this increase in employment causes individuals to move from areas with more alternative opportunities and a larger social safety net to these smaller communities, the risks faced by individuals employed within this type of work will increase.

Comment 24: Although Amendment 18 is a short-term interim solution, if it is not enacted soon, management might lose the option of dealing with long-term rationalization. Without Amendment 18 being approved, the more efficient offshore fleet will capture an ever increasing share of the TAC and reduce the viability of the inshore fleet dramatically. The sector may be so weakened that a decision to disapprove this amendment would be irreversible. Failure to approve this measure would lead to a de facto allocation of all or most of the resource to the offshore fleet and cause a loss of diversity within the fishery.

Response: Prior to the first allocation in 18/23, the inshore sector had grown over a fairly short period to taking a

significant share of the pollock resource, and new plants have continued to come on line. It is not apparent that, without the passage of Amendment 18, that their share will decline in the next few years, although their rate of growth could decline. In addition, this is an allocation that will benefit processing plants, which in the shoreside sector, have fairly large corporations as their primary owners. These corporations could likely sustain a short period of losses to maintain their position within the fishery. In addition, the reduction of allocation to the offshore fleet might cause the exiting of a number of vessels in that sector so the overall viability and diversity could still occur with this amendment.

Comment 25: The allocations would allow for a predictable supply of fish allowing onshore plants to operate nearly year-round and provide a sustained demand for support services. This would provide more opportunity for permanent residents to work, and for other workers to become permanent residents, and allow for longer term planning abilities and financing, as harvesters could choose the best times for fishing. In addition, groundfish plants will be available for traditional species markets such as black cod (sablefish), Pacific halibut, salmon, crab, etc.

Response: NOAA agrees with the comment in that the allocations should allow for increased fishing seasons by increasing the amount of time it will take to reach TAC due to limiting competing processor/harvesters to certain areas. This would relieve fishing pressure, in the absence of any new

capacity.

Therefore, the possibility of operating nearly year-round is possible, which could lead to an increased demand for workers. When work is available on a consistent basis, positions become more dependable allowing individuals to maintain residency. If work is not available, residents must move elsewhere to find work. In addition, if work remains stable, long-term plans can be made and development progresses, allowing groundfish plants to remain open and available to process other species. Stability as well as social and economic growth in the coastal communities of Alaska are objectives of the amendment.

Comment 26: The allocations would allow harvesters to determine the best time to fish based on the condition of fish, the weather, and when recovery and value would be highest.

Response: NOAA agrees with the comment in that, by being guaranteed a percentage of fish, the "race for fish" is curtailed and harvesters can choose when they want to fish as long as TAC remains in either component. Harvesters delivering to the inshore component would be limited only by their portion of the TAC, and not by the harvesting capability of the offshore sector.

Comment 27: Shoreside sector has much higher product recovery rates (PRRs), particularly for surimi. The supplementary analysis for revised Amendment 18 stated the surimi recovery rate for the offshore sector to be 17.7 percent. A NMFS study of factory trawlers showed the PRR of surimi during the "A" or roe season (January 1-April 15) to be only 14.35 percent and

NMFS recently recommended a rule that established the offshore surimi rate to be 14 percent. Section 2 of the supplementary analysis fails to use existing data that the roe recovery rate is equal for inshore and offshore. The analysis overlooks a lot of data on PRRs and the result is PRRs are overstated for the offshore fleet and understated for the inshore processors.

Response: The analytical team opted to use the most recent complete year for which information was available, rather than matching partial data from 1992 with complementary data from 1991. This is a fairly standard approach. The analytical team recognized that this is a fishery that has been developing rapidly, and that any parameterization of industry behavior, under such circumstances, will be flawed on some grounds. Additionally, some of the data that is being cited in the comments were not even available in May when the analysis was completed. Because of the timeline mandated by the Council, no opportunity was available to revisit these issues as more complete information from 1992 became available. In addition, blend estimates of pollock catch for the at-sea sector were generated recently by NMFS, but time was not sufficient to incorporate these estimates into the analysis of this amendment. Use of best-blend estimates will diminish the importance of the PRRs about which substantial uncertainty and variability will continue. Point estimates being supplied by individual operations may be accurate but do not necessarily reflect either what that individual operation can sustain over time or what the

entire industry could realistically achieve.

Comment 28: Revised 18 promotes conservation in that the possibility of localized pulse overfishing by factory trawlers would be reduced.

Response: The allocations as approved are not expected to result in increased fishing effort or to negatively impact pollock stocks by either the offshore or the inshore sector, and should actually force the fleets to disperse. Effective management of TACs, as in the past, will prevent resource depletion. However, there is no evidence to indicate that increased allocations to the inshore sector, over time, could not increase localized depletions or prevent early closures or shore-based overcapitalization. The potential problems of localized depletion will be addressed through further management actions as done in the past.

Comment 29: The shoreside sector has demonstrated its concern for the fishery by attempting to delay the non-roe or "B" season (June 1-December 31) to reduce catch of juvenile pollock, Pacific herring, and salmon bycatch. In addition, the shoreside sector set up a voluntary herring savings area to reduce herring bycatch in 1991 and 1992.

Response: NOAA acknowledges and appreciates the concern fishermen have for the resources that sustain them. Self-regulation is certainly a benefit for the resource.

Comment 30: Benefits to the Nation with approval of Amendment 18 would include an increase in food production and

value, as well as a reduction in wasteful discard of fish.

Response: Some current data suggest that the recovery rate of the inshore sector is somewhat higher than the offshore sector. Inshore processors presently convert a higher percentage of fish from round weight to finished product. The best information currently available to estimate discard amounts in the groundfish fisheries indicates no reason exists to believe that discard amounts will increase or decrease under revised Amendment 18. The amount of prohibited species taken in the groundfish trawl fisheries is largely governed by prohibited species catch (PSC) limits, attainment of which will prohibit further fishing for specified species by both inshore and offshore operations. In addition, the factory fleet has indicated that it expects to increase recovery rates while decreasing wastes as more is learned about the improved technology used by the inshore sector. Shoreside processing plants have demonstrated an increase in use of all raw materials. while some factory trawlers may experience a greater loss of potential product due to the conditions under which they must work. Equipment used for preparing fish products must be precisely set and rough conditions experienced at sea on the factory trawlers could prevent maximum efficiency of processing equipment. The inshore processing plants do not have to deal with the movement of equipment and can be more precise in their cuts of fish.

A reduction in groundfish bycatch would leave more of the

target species available for harvest; however, no evidence exists to support that the inshore sector experiences reduced bycatch. The vessels that deliver to the inshore sector employ the same type of equipment used by the factory trawlers. Therefore, they are both subject to the same problems with catch of prohibited species. Bycatches of halibut, crab, and herring are controlled by PSC limits. While bycatch rates may differ among fisheries, total bycatch amounts are expected to continue at levels that approximate the PSC limits.

These same issues were dealt with in the final rule published for Amendments 18/23.

Comment 31: The offshore sector has a higher preprocessing discard rate, which can be verified by the 1992 data. This constitutes a waste of our resources and discards should be counted as a cost to the nation. This amendment will reduce waste and promote conservation.

Response: The analysis takes into account discards; however, the 1992 data cited in the comment are from a small subset of factory trawlers' performance and cannot be necessarily extrapolated up to the entire fleet. Because only a portion of the harvest taken by the inshore fleet is actually observed as well, it is difficult to project that as the entire inshore fleet performance level and to say definitively that their preprocessing discard rate is lower.

With regards to the conservation issue, fish are not the only scarce resource used as an input into production of finished

fish products. Labor, fuel, and other capital are also employed so waste needs to be placed in context of total resources employed to generate the same quantity of output. However, as one of NMFS mandates is conservation of fish stocks, actual quotas are set on total catch (including discards), not retained catch, as to avoid overharvesting of the stocks.

Comment 32: The offshore sector has other fishing options available to it as it is more mobile. The inshore sector is solely dependent on resources close at hand.

Response: NOAA recognizes the competitive advantage of the mobile offshore component. Approval of the CVOA during the "B" season will provide needed protection to the inshore component in an area close to shore.

Comment 33: The inshore sector should not be penalized for failing to capitalize as rapidly as the offshore fleet, because part of the offshore fleet's growth can be attributed to federal loan guarantees and capital subsidies by both the U.S. government and foreign interests.

Response: The allocations proposed under revised Amendment 18 are not intended to penalize either the inshore or the offshore component. Instead, the intent is to provide protection to the inshore component to allow the utilization of the fishery resource while acknowledging the fishery interest of the offshore component. Approval of revised Amendment 18 demonstrates this point.

Comment 34: By requiring fishermen to declare where they

may sell their product for an entire calendar year, fishermen are prohibited from selling to a more competitive purchaser, thereby restricting trade. In addition, in attempting to protect a specific industry sector in a specific location from competition with another sector, freedom of trade between states is restricted.

Response: Amendment 18 does not restrict to whom a harvester may sell fish, rather it restricts the receipt of fish by the inshore versus offshore processors, as defined in the regulations, in excess of their specified percentages. In addition, the allocations do not restrict freedom of trade between states as they do not restrict where delivery or sale of fish may occur.

Comment 35: Approval of revised Amendment 18 will transfer significant control to foreign interests that dominate the Alaska shoreside processing industry. In effect, the allocations illegally giveaway Washington State jobs and U.S. resources to Japanese companies. The allocation will increase the market power of the Japanese within these markets.

Response: See response to comment 19.

Comment 36: Allocation should be based on harvesting rather than processing rights. Otherwise, "foreign leakage" is a problem. Rents, or benefits, from the fishery are much more likely to be captured by allocating to harvesters as opposed to processors.

Response: "Foreign leakage" refers to the accrual of

benefits to persons and firms outside of the U.S. The RIR/FRFA indicates the difficulties of measuring foreign leakage due to imperfect knowledge of the level of investment foreign firms have in the BSAI pollock fishery. Foreign firms are known to have investments in vessels in the offshore component as well as shorebased plants and vessels in the inshore component. Hence, the foreign leakage problem, if it is a problem, would not be entirely resolved by allocating between components defined as harvesting vessels instead of processing vessels. Although benefits to the U.S. could be larger under such an allocation, NOAA has no verified information on which to determine if such benefits would be significant.

Comment 37: Revised 18 does not correct the failings of Amendment 18 identified in the March 4, 1992, letter of disapproval from Dr. Knauss and, by refusing to measure the preferred alternative against others, the Council has admitted there is no new justification for approval of revised Amendment 18.

Response: Dr. Knauss, in his March 4, 1992, letter to the Council, disapproved portions of Amendment 18 based on a lack of information that would justify the higher percentages being allocated to the inshore component. The economic effects in the succeeding years were not fully understood at the time. He stated a supplemental analysis would be necessary before further consideration could take place. On September 3, 1992, the Council, with the aide of NMFS staff, completed a supplementary

analysis. The analysis compared various alternatives and concluded that the preferred alternative, although leading to a negative benefit to the Nation, provided sufficient economic and social development to the Alaska coastal communities in the BSAI that its adoption was warranted. As was the case with approval of Amendment 23 and partial approval of Amendment 18, the social benefits outweigh the economic costs to the Nation.

Comment 38: As stated in the March 4, 1992, letter from Dr. Knauss to the Council, safeguarding capital investments is a desirable objective under the Magnuson Act. The Council has totally disregarded this obligation under the Magnuson Act.

Response: NOAA disagrees with the commenter in that the Council is considering not only the interests of the offshore component, but also the interests of the inshore component. The Council has an obligation to both the offshore and the inshore component when recommending appropriate management measures for the Alaska groundfish fishery. In view of the possibility of preemption, an allocation of the pollock TAC in the BSAI guarantees both the offshore and inshore sectors access to the fishery. In any event, investments prior to 1992-95 are considered sunk costs and are not factored into the cost-benefit analysis for either the inshore or the offshore component.

Comment 39: Maintaining the status quo would have accomplished the goals identified in the March 4, 1992, letter from Dr. Knauss. During the non-roe or "B" season, the shoreside sector operated for 77 days, while the offshore operated only 58.

Prior to allocations, both sectors operated an equal number of days. If the allocations are approved and increased in 1994 and 1995, the offshore sector will be further decreased, especially taking into account losses to be incurred during the roe or "A" season.

Response: The shortening of the offshore fleet season with the creation of the CVOA restriction during the B season was a predictable result. The supplemental analysis for this amendment projects future losses for the offshore fleet but gains for the inshore sector.

Comment 40: The Council has done little to "work as expeditiously as possible toward some other method of allocating fish than either the olympic system of direct government intervention" as urged in the March 4, 1992, letter from Dr. Knauss, (i.e., IFQs).

Response: NMFS urged the Council to work toward a more efficient method of allocating fishing privileges other than direct government intervention when Amendment 23 and part of Amendment 18 was approved. NMFS is aware that the Council currently is working on a moratorium on the entry of new vessels into the fisheries, to be followed by a permanent solution to excess fishing capacity. Any incentive to over-invest in the inshore catching and processing sector will be tempered by the planned expiration of the approved allocations, and the possibility of limited access measures in the near future. An individual fishing quota (IFQ) proposed rule was submitted

October 27, 1992, and the Secretarial review process has begun.

Comment 41: Amendment 18 does not live up to the fundamental principle of the Magnuson Act to use "wise management of the fisheries as the best economic safeguard for those who derive their living from these resources."

Response: The allocations proposed in revised Amendment 18 are intended to be temporary, interim management measures to alleviate the problem of preemption in the Alaska groundfish fishery. The allocations will provide a certain amount of protection to the inshore component, which depends on the fishery for its livelihood. NOAA has urged the Council to continue working towards more efficient management measures such as limited entry and IFQs. In the meantime, NMFS will provide necessary management measures to protect the resource as well as the temporary allocations to protect the resource-users. This does not indicate the offshore component is not a resource-user. The offshore component also will be allocated a portion of the pollock TAC.

Comment 42: A statement that a broad consensus of the industry supported the Council's action is untrue.

Response: NOAA concurs. The allocation recommendations of the Council under Amendments 18/23 and revised Amendment 18 appear to be highly controversial and divisive within the fishing industry.

Comment 43: Revised Amendment 18 is politically biased and conflicts of interest exist in the Council. Such issues will

continue to invite costly litigation.

Response: A similar comment was raised during the review of Amendment 18/23. Again, the Magnuson Act requires each voting member of a Regional Fishery Management Council and the executive director of each Council to disclose any financial interest in any harvesting, processing, or marketing activity that is being or will be undertaken within any fishery over which the Council concerned has authority. Financial interests that must be disclosed include those held by the individual, his or her spouse, minor child, or partner; and any organization (other than the Council) in which the individual is serving as an officer, director, trustee, partner or employee. If the individual complies with the requirement to file a financial disclosure statement, he or she is exempt from criminal liability under section 208 of the United States Code.

In developing the Magnuson Act, Congress recognized the need to have members of the fishing community sit on the Council and bring with them to the meetings their fisheries knowledge and experience. Congress understood that by requiring nominees with this type of background, some members may be voting on issues that would directly affect their fishing operations, positively or negatively. Regardless of the effect, Council members are not required to excuse themselves from a decision unless the matter is primarily of individual concern. Council members are required to be as non-biased as possible.

Concerning litigation, any action of such controversy and

magnitude as Amendment 18 is expected to be met with challenge. NOAA reviews such actions as fairly as possible and attempts to provide clear justification for any decision.

Comment 44: The Council has not adequately addressed the merits for choosing the preferred alternative versus other possibilities, in particular, alternative 6, which would have allowed the catcher vessels to decide to whom they would sell. In addition, it is the catcher vessel sector that has been preempted, not the inshore sector. The Council has not explained how the preferred alternative will address this problem of preemption in the fishery.

Response: The preemption of catcher vessels may be a problem, but it was not the problem addressed by the Council. The Council may address this problem in the future if it wishes. Alternative 6 was not recommended to the Secretary in Amendments 18/23 or in revised Amendment 18, because allocations of pollock under that alternative did not provide the Council with sufficient assurance that the desired amounts of pollock would be delivered to processing plants in the State of Alaska.

Comment 45: The Department of Commerce does not have the legal authority to allocate processing rights, only harvesting rights and should have chosen Alternative 6 as its preferred option.

Response: Revised Amendment 18 does not make allocations among processors. The allocations are between fishing vessels that catch and deliver for processing by either the inshore or

offshore component. The allocation directly applies to fishing vessels because it limits the amount of fish a vessel can deliver to either component. In addition, vessels that catch pollock are subject to directed fishing allowances and retention prohibitions and, therefore, the burden of complying with such prohibitions is placed on these vessels that actually catch the fish. The Secretary is authorized to make such an allocation under the Magnuson Act.

Comment 46: The indirect and induced effects of the direct income is higher for Alaskan coastal communities of the inshore sector than can be attributed to the offshore sector.

Response: The results referred to in this comment were derived by using numbers from different impact studies and are not comparable with the results in the Councils' Input-Output study. In general, indirect and induced effects will be larger (have higher multipliers) for larger communities, because more of the initial income change will be captured and re-spent within the presence of support industries and other services. The smaller the community, the more of the income will "leak" to other areas, where the indirect and induced impacts will contribute.

Comment 47: The raw fish are a public resource which neither sector has to pay for the right to harvest to the actual owner (the public). Taxes are one way the public receives benefit from the fish. Because the offshore fleet only pays a minimal number of taxes as opposed to the inshore fleet, a

transfer of more resource to the inshore fleet allows the public to have more compensation from the use of the resource.

Response: Taxes are one vehicle that can be used to convey or capture compensation to the true owners of the resource. However, the current tax structure only benefits a subset of owners--those in Alaska. One option would be to allow both the offshore fleet and inshore fleet to pay a national user tax. See also response to comment 22. If this allocation necessitates growth in governmental services, then the increase in tax revenue may not be sufficient to offset the extra costs.

Comment 48: It is inappropriate to cite and use the total amount of fish tax, rather than the tax for pollock deliveries, while considering the benefits of inshore production for the State of Alaska.

Response: NOAA concurs that when calculating the benefit of processing more pollock on shore, only pollock deliveries should be considered.

Comment 49: The analysis of the benefits of the proposed increase in fish to the inshore sector does not incorporate the private costs associated with the increased processing capacity needed nor the accompanying additional social infrastructure that will be required.

Response: The quantitative results in the supplemental analysis are only a projection over a relatively short time period (until 1995) when this measure would expire. With the addition of capacity in recent years in shoreside processing, not

much more capacity would need to be added in the short-run. In addition, the social study does not expect significant changes in structure over the same time period. The supplemental analysis reflects increased capacity and capital investment that has occurred recently. Given the current inshore season length, any further capacity would not likely be needed to harvest the proposed increases in allocation. Whether the allocations encourage further investment is another matter about which this amendment can say little except to note this is a common feature of an open-access fishery.

Comment 50: The supplemental cost-benefit analysis is overly simplified and relies on faulty information. Inadequate data were used to project market prices, (based only 1 year) and to construct supply functions. The analysis does not incorporate recent changes in the size and number of operations in both sectors. A bioeconomic model should have been constructed instead.

Response: Biologists were unable to predict any feedback or impact from this rule. TACs are set separately, so if the harvest remains within a TAC, then it should not matter, for the health of the fish stock, who processes it. Any model is a simplification of the actual real world, and is subject to time and data constraints. One need not produce an elaborate, formal cost-benefit analysis in order to gain some insight into the most likely direction of results from action. It can be useful just to take numerical results as indicators on the impact to the

sectors.

The timeframe afforded to the analysts did not permit the development of a predictive model for market prices into the future. The most recent year is often used in such circumstances as the best available information regarding what the future will bring. Nor was the available time adequate to conduct thorough demand studies of world and U.S. surimi and fillet markets, and their interactions. Further, the data available were totally inadequate to produce a legitimate supply function for both sectors of the industry. To say that the analysis does not take into account recent changes in the industry is simply incorrect. The analysis is based on the last complete year of information, which was 1991. The analysis was conducted less than 6 months following the end of the year from which the information used.

Comment 51: The supplementary analysis demonstrates a potential loss to the nation of $34-60 million. This is based on an erroneous analysis that, if corrected, would show a positive net benefit of $88 million.

Response: The estimate of net benefits of $88 million is based on a set of parameter values that was supplied directly to the Council by a subset of the processors and were not reviewed by those who prepared the supplemental cost-benefit for the revised amendment. Part of the differences in the estimates appear to be due to confusion about how to calculate product recovery rates as opposed to yield or production rates. Secondly, the author of the study assumes that variable costs for

inshore plants are distributed 50 percent on the basis of volume and 50 percent on the basis of value. When public comment has often observed that the factory trawlers have lower costs of catching fish, this assumption produce the result that the variable costs of producing surimi, per mt of harvested catch, are actually $16 higher at sea. This result is derived directly from his assumed basis for assigning cost. If one assumes that operating costs are driven by the time spent processing the fish, then a volumetric approach, rather than a value approach, would seem more reasonable. Assigning 80 percent of the costs on the basis of volume, 20 percent on value would have the effect of making inshore cost $19/mt more expense than at sea, rather than $16 cheaper. Although this version has the correct general observation that taxes paid by foreign interests should be included in the calculation of U.S. benefits, it assumes that the companies actually pay the full 35 percent of the profits calculated, which may or may not actually be the case. Despite the fact that crew jobs in the at-sea sector receive higher payments, this draws the conclusion that the gain in quasi-rents, per mt, to labor in the inshore sector will be 7 times the amount lost in the at-sea sector. This assertion is unsubstantiated.

Comment 52: The revised Amendment 18 cost-benefit analysis shows a net gain in producer surplus as a result of the approving of this measure.

Response: The positive cost-benefit finding is reported only in section 8 and represents total benefits to all U.S. and

non-U.S. owners of capital in the pollock industry. It does not take into account the leakage of benefits to foreign interests. While the methodology presented earlier in the document was flawed by not including payment of U.S. taxes by foreign interests, the general approach continues to be the appropriate measure of national benefits. Inclusion of this component, with the appropriate revisions, would result in a finding of negative benefits. Additionally, the section 8 table does not include any of the lost surplus attributable to the labor sector.

Comment 53: The cost-benefit analysis should incorporate more than just the maximization of private profit. Other considerations, such as physical waste, marine pollution, and loss of food production, must be incorporated.

Response: The cost-benefit study addresses more than profit. But for private goods, the value derived from their consumption accrues to either producers or consumers of product. This surplus is what the study attempted to measure. Food production differences (PRR/product mix) were incorporated in the analysis. Where quantitative measures could not be provided, such as for the cost of pollution and other negative externalities in both sectors, it was addressed qualitatively.

Comment 54: The supplementary analysis for revised Amendment 18 admitted the computation of fish meal production was understated yet did not correct the error in the computation of producer surplus.

Response: In the numeric analysis, fish meal is treated as

an ancillary product and the recovery rate used is 1.0. Treating roe and meal as additional rather than primary products means that quantities of those products in the model will depend solely on the amount of raw fish processed by each sector. This may not match with actual observed product levels.

Comment 55: The supplementary analysis states the cost for factory trawlers to harvest and process pollock into surimi is $0.10 per pound. This assumption does not take in to account the cost of fuel, depreciation, equipment repair, and other services.

Response: The fact that the surimi cost is so much lower than for production of fillets in the supplemental document does not match with testimony from a number of sources. Each process was calculated separately and the revised analysis clearly could have benefited from a longer period of review and revision, as well as more time to address public concerns following the initial presentation to the Council in July. Different methods, unfortunately, were used for calculations between sectors in the initial cost-benefit study, but given the time constraints, effort was spent to improve the model to yield greater returns rather than address this artifact of the previous study.

Comment 56: The supplementary analysis treats wages differently for inshore and offshore workers. Wages to the offshore are viewed as profits, while wages earned by the inshore are not counted as a gain to the workers.

Response: Wages for at-sea workers are not treated as profit. A portion of the lost share-based income is treated as

lost producer surplus, while a portion of the gains to inshore share-based workers (fishing crew) is treated as gained producer surplus. Furthermore, from the standpoint of calculating at-sea profits to owners, payments to labor are treated as a cost. It just happens that a portion of those share payments represent a surplus to the workers in excess of their opportunity costs. A similar assumption is not made concerning the wage-based labor in the inshore processing plants.

Comment 57: The supplementary analysis does not count taxes paid to the government as a benefit to society.

Response: NMFS concurs that an oversight occurred in addressing the tax implications as to whether they were benefit that were accruing from the international community to the national level. However, the inclusion of a tax payment by foreign interests would not have altered the negative net benefits conclusion, only reduced somewhat the magnitude of the loss.

Comment 58: NMFS uses the wrong percentage of foreign ownership in both sectors to account for foreign leakage of benefits outside of the nation. It also ignores the benefit of taxes paid by foreigners to the U.S. government in its analysis.

Response: Both sectors noted that the foreign ownership calculation was incorrect but it is hard to ascertain actual ownership within the corporate structure, and how much control that ownership or capital investment has within the market to reallocate profits. The best information available was a few

years old, but no more recent follow-up work had been done or could be completed within the available timeframe.

Comment 59: Subsidy of shoreside plants during their initial operations in the early 1980s was ignored in the cost-benefit calculations.

Response: See response to comment 38. The cost-benefit study focuses on 1992-1995, so any prior investments are considered sunk costs. In addition, Federal funds were available to both sectors through a variety of government programs such as the Saltonstall-Kennedy Grant Program and the Fisheries Obligation Guarantee Program.

Comment 60: Because the results of the economic analysis showed a net loss as resource were shifted away from the offshore sector, the Council should have evaluated an alternative that increased the allocation to the offshore fleet.

Response: The apparent willingness of the at-sea processors to out bid the onshore processors for pollock may suggest, at least on the margin, the benefit per mt of pollock is greater for at-sea processors. The economic analysis indirectly did provide information on the benefits and impacts of an increase to the offshore, if one considers the reversal of the projected losses. The Council did not consider an increased allocation because they had other objectives beside increasing flow of national net benefits.

Comment 61: The models and analysis used for the cost-benefit study may be sufficient for gauging short run industry

producer surplus from a given pollock TAC, but not sufficient for providing the construct of actual supply and demand equations.

Response: The assumption that this was a short-term measure and the TAC is relatively fixed was felt to be valid so this type of study was appropriate as opposed to actually estimating the functions. Also there were not sufficient data to construct the market curves.

Comment 62: The cost data for inshore processors is not based on any formal survey and does not allow one to attribute cost by product form. This and other deficiencies make it hard to generate any statistical measures of their accuracy and make the results of the cost-benefit study questionable.

Response: See response to comment 2. NOAA concurs new data are constantly needed and recognizes the dynamic changes occurring in this fishery. The risk analysis performed as a part of the cost-benefit analysis is a small attempt to capture some of the uncertainties.

Comment 63: Variable costs should have been attributed among products based on price as opposed to volume.

Response: The use of price was considered to be the best decision, made by the analysts, based on understanding of the cost components that should be attributed by the volume produced. As noted in previous response, the attribution of variable costs would ideally be based on the time consumed by the processing activity, assuming that the cost per unit of time spent is equivalent across various species. We received no information

indicating, for instance, that the labor costs per unit of time were any different across species. Volume of fish handled would seem to be a more accurate representation of time spent than the value associated with the output products. If the value argument were used, the cost of producing surimi and roe during the "A" season would be substantially higher than producing surimi alone, and this does not seem reasonable.

Comment 64: Section 8 of the supplementary analysis is unfair and biased. It includes a cost-benefit analysis done by the Council after-the-fact to justify approval of the allocation. The analysis ignores extensive testimony of some parts of the industry and its own Scientific and Statistical Committee and relies solely on shoreside interests to produce model parameters. The predicted result of this 'testimony' scenario does not at all resemble the actual fishery performance for the year modeled (1991). NMFS team of economists refused to be identified as preparers of this section.

Response: This section should be viewed as stated as a Council document reflecting the differing parameters the Council decided were important. It is not a before-the-fact analysis of likely results, and because it was not part of that revised study, NMFS staff should not be considered as authors beyond the extent they helped construct the analytical tools used in this section.

Comment 65: Section 8 fails to account for the cumulative costs revised 18 would have on the offshore component. It

ignores the costs already imposed on the offshore fleet under Amendment 23 in the GOA.

Response: The revised analysis only look at the marginal costs, benefits, and impacts arising from the proposed new allocations. It would not be appropriate to incorporate the results from any other previous management action which has already been determined as an appropriate action.

Comment 66: The analysis did not take into account that the mobile offshore fleet has many more options for alternative activities than the smaller shorebased ones.

Response: Insufficient time was provided to assess the true opportunity cost to the at-sea sector (i.e., opportunities for shifting effort to other fisheries, mainly in Russian waters). The price currently being paid for the opportunity to fish in those waters by some members of the at-sea fleet does not, by itself, supply enough information to accurately assess the profitability of those operations or the value of fishing in the EEZ as there are differences in risk, management regimes, etc.

Comment 67: Creation of the CVOA during the "B" season gives the inshore fleet the choice of unlimited access outside of that area but exclusive access within.

Response: The CVOA was established to address the dependence of
the inshore component on pollock resources in nearby waters and to provide needed protection for the inshore component within this area. During a August 4-5, 1992, meeting, the Council

considered comments received from the advisory bodies and the public and recommended that offshore vessels that process only (i.e., motherships) be allowed to operate in the CVOA during both the "A" and the "B" season. This would allow catcher vessels that deliver to these offshore motherships to operate in the CVOA. Outside the CVOA, the inshore component is restricted by its percentage of the allocation of which it may not exceed.

Comment 68: Approval of the CVOA cannot be justified now that the Bogoslof area is closed and the offshore is being preempted from its most productive and valuable fishing area by the same interests that would profit from the CVOA, especially since the inshore will have a guaranteed quota.

Response: See response to comment 67. The CVOA limits access to pollock within this area, only during the "B" or non-roe season (June 1-December 31), to catcher vessels delivering to the inshore component and motherships of the offshore component that process only. However, the offshore component is allowed access to the CVOA during the "A" or roe season (January 1-April 15) in recognition of the high economic value of pollock roe to at-sea processors. NOAA also recognizes the importance of the Bogoslof subarea as a fishing ground; however, continued protection of Steller sea lions is necessary.

Comment 69: Approval of the CVOA would result in safety risks to the offshore sector, higher discards and lower recovery rates due to smaller fish, higher operational costs, gear conflicts, and ground preemption problems with crab and longline

fishermen. In addition, the offshore pollock fleet would be preempted from entering the salmon processing industry. Analysis of the CVOA does not incorporate any increase in the operating costs due to harvesting and processing of smaller size fish by those vessels displaced outside of the zone or the cost of increased gear conflict with fixed gear fisheries.

Response: See response to comments 67 and 68. NMFS agrees that fishing patterns would be affected in response to implementation of the CVOA in the BSAI area. This action establishes the CVOA and specifies inshore-offshore allocations of pollock only for the "B" or non-roe season. In addition, revised Amendment 18 was changed from the original Amendment 18 to allow motherships that only process access to the CVOA. Historical catch data indicate that large amounts of pollock are likely to be available north and west of the CVOA during the "B" season. The Council retained the CVOA during the "B" season because catcher vessels that deliver their pollock catch to shore-based processing plants in the Aleutian Islands have a limited range compared with catcher/processor vessels that can harvest pollock resources north and west of the CVOA. In addition, public testimony indicated the possibility of overcrowding and grounds preemption within the CVOA by the catcher/processor fleet. Approval of the CVOA during "B" season will provide needed protection to the inshore without resulting in a significant net economic loss to the Nation nor undue hardship to the offshore component.

Comment 70: In the past, NMFS and the Council rejected similar CVOA proposals that would have applied to foreign fishermen and joint venture fishing operations. The reasons for disapproving such an area then, apply to the CVOA as now proposed.

Response: The Council proposed a fishery development zone (FDZ) in Amendment 6 to the BSAI groundfish FMP. The FDZ was intended to exclude foreign fishing and be reserved for the use of U.S. fishing vessels only. This amendment proposal was disapproved by the Secretary on December 8, 1983, even though the concept was supported, because, during the preliminary evaluation, the Secretary determined that the amendment did not show evidence of consistency with the national standards and was not sufficient in scope and substance to warrant review. The Council was informed of the reasons for disapproval and provided with information on rectifying the deficiencies. The disapproval was not appealed. In Amendment 9, the Council proposed closure of areas west of 170° W. longitude, within 20 nautical miles of the Aleutian Islands, to foreign trawling. The Council proposed this measure to reduce the foreign bycatch of fully utilized species such as rockfish. The Secretary disapproved this part of the amendment because the proposed area closure was not the most effective way to resolve the bycatch problem. The next time that the Council considered an exclusive area in 19??, it was rejected by the Council. Hence, the reasons for Secretarial disapproval of the two previous exclusive area proposals are not relevant to

the CVOA proposed as part of revised Amendment 18. In this instance, the CVOA is necessary to assure that catcher vessels that deliver "B" season pollock primarily to the inshore component will have reasonable opportunity to harvest the pollock allocation to the inshore component without preemption by the offshore component which may harvest its "B" season allocation in other areas.

Comment 71: The CDQ is needed to help local communities offset the high capital costs of entering the BSAI groundfish fisheries.

Response: NOAA agrees with the comment. The CDQ program was established to help develop commercial fisheries in eligible western Alaska communities on the Bering Sea coast that otherwise may not have been able to break into the fishery. The Secretary had approved the CDQ in concept through December 31, 1995, as a part of the final rule for Amendments 18/23. This decision has not been changed. Proposed regulations to implement the CDQ are the subject of a separate rulemaking.

Comment 72: The CDQ part of the proposed action is not consistent with the stated problem to be solved (preemption) and no cost-benefit analysis was done for this portion of the allocation.

Response: See response to comment 71. The CDQ complies with the Council's Comprehensive Fishery Management Goals that were adopted in 1984. Goal 3 calls for promotion of economic stability, growth, and self-sufficiency in maritime communities.

The Council had concluded during the original adoption of the CDQ program that eligible western Alaska communities would be unlikely to attract the needed capital investment to develop as long as the threat of preemption existed. Analysis of the CDQ program had been considered during the review period for Amendments 18/23 and had been approved, in concept. All that remains is to implement the CDQ, which is being accomplished under a separate rulemaking.

Comment 73: The allocations would be prejudicial to some CDQ participants because those at-sea processors that are neither catcher vessels nor motherships would be precluded from entering the CVOA. On the other hand, catcher vessels and motherships would be allowed to operate in the CVOA, reducing costs of transportation. The overall effect would be to drive up the expenses of the at-sea segment. The CVOA is unnecessary if the comprehensive rationalization of the fishery occurs and the CVOA discourages some potential participants in the CDQ program.

Response: Communities that are eligible for the CDQ must be located within 50 nautical miles from the baseline from which the breadth of the territorial sea is measured along the Bering Sea coast from the Bering Strait to the western Aleutian Islands, or on an island within the Bering Sea. It is not anticipated that any of these communities would declare themselves to be part of the offshore component. Under the CDQ program, 7.5 percent of the non-specific reserve will be set aside for the CDQ reserve, regardless of the inshore/offshore allocations. The intent of

the CVOA is to provide protection for the inshore component and has no affect on participation of eligible communities in the CDQ program.

<u>Comment 74</u>: If the CVOA is approved, the non-roe or "B" season should be redefined so that it lasts only 5 weeks (or whatever period would affect the at-sea component. In addition, if individual fishing quotas (IFQ) come about, the CVOA would be unnecessary.

<u>Response</u>: Directed fishing for the second seasonal allowance of pollock, commonly known as the non-roe or "B" season, may occur at any time during the period June 1 through December 31 under § 675.20(a)(2)(ii). Although the "B" season is specified for this period, directed fishing by, or for delivery to, either the inshore or offshore component is expected to occur during a much reduced time period within this season. After closure of the offshore component's directed fishery, the existence of the CVOA becomes moot, unless it is reopened later in the fishing year due to a reapportionment of reserve.

The CVOA may continue to be necessary under an IFQ program for the pollock fishery if catcher/processors are able to preempt vessels with limited range that deliver to shorebased processors and prevent or impede them from harvesting their respective IFQs.

<u>Comment 75</u>: The amended language in the prohibition sections of 50 CFR 672.7 and 675.7 to ensure that mobile processors declaring themselves to be part of the inshore component remain at a fixed point throughout the year may be

incomplete. The portion of the sections which state, "when that vessel engages in a directed fishery for Pacific cod in the GOA or pollock for the first time in a fishing year" may lead to an interpretation that a vessel may have two fixed locations, one for Pacific cod and one for pollock. It might be useful to provide further clarification of this sentence.

Response: Harvesting and processing can be independent operations that may occur in different areas. With regard to harvesting, the single location criterion under the "inshore component" definition applies to "...pollock, harvested in a directed fishery for pollock, or Pacific cod harvested in a directed fishery for Pacific cod in the GOA..." (§§ 672.2 and 675.2). Without reference to a specific management area, this definition applies to any pollock harvested anywhere. For Pacific cod, it applies only to Pacific cod harvested in the GOA. For example, Pacific cod harvested in a directed fishery for this species in the GOA would be affected by the inshore-offshore allocation rules even if the fish were actually processed in the BSAI area. With regard to processing, the definition explains that a "single geographic location" means the location at which a processor vessel first engages in a directed fishery for Pacific cod in the GOA or pollock (harvested anywhere) during a fishing year. For example, if a processor vessel reported a single location adjacent to the BSAI to process pollock harvested in a directed fishery for pollock in that area and then moved to a different location adjacent to the GOA to process either pollock

or Pacific cod harvested in directed fisheries for those species in that area, then the GOA location would be considered the second location. This would be a violation of the "inshore component" definition. This interpretation was fully explained in the preambles of the proposed and final rules for Amendments 18/23 published in the Federal Register (56 FR 66009; December 20, 1991, and 57 FR 23321; June 3, 1992, respectively).

Comment 76: The Department of Commerce's Inspector General and the antitrust division of the Department of Justice objected to flaws in the analysis of the rule.

Response: Comments responding to Amendments 18/23 presented this same argument. The Department of Commerce Inspector General had reviewed allegations of conflict of interest in the Council, see response to comment 43. The final rule published for Amendments 18/23 on June 3, 1992 (57 FR 23321), explained that the Antitrust Division of the U.S. Department of Justice had reviewed the Amendments and provided no indication that the amendments would be in violation. However, should it appear that, at some point in the future, a violation of the U.S. antitrust law has taken place, appropriate action will be taken by the U.S. Department of Justice.

Comment 77: Revised Amendment 18 is in violation of the Appointments Clause of the U.S. Constitution. The majority of the voting members of the Council are selected by the Governor of Alaska and biased the creation of Amendment 18 to promote social interests rather than legitimate conservation and management

goals.

Response: The Appointments Clause is contained in Article II, section 2, clause 2 of the U.S. Constitution. The Appointments Clause states that ". . but the Congress may by Law vest the Appointment of such inferior Officers, as they think proper, in the President alone, in the Courts of Law, or in the Heads of Departments." Under the Magnuson Act, there shall be established, for the purpose of fishery conservation and management, eight Regional Fishery Management Councils. One of those Councils, the North Pacific Fishery Management Council (NPFMC), consists of the States of Alaska, Washington, and Oregon and has authority over the Arctic Ocean, the Bering Sea, and the Pacific Ocean seaward of Alaska. The NPFMC has 11 voting members. Seven of these members are appointed by the Secretary of Commerce. Of these seven, the Magnuson Act states that 5 shall be appointed from the State of Alaska and 2 from the State of Washington. The other 4 voting members consist of the principal State official for each represented state, designated by their respective governors, and the NMFS Regional Director. Based on Congressional approval of the procedures of the Magnuson Act, revised Amendment 18 does not violate the Appointments Clause.